Series 1953, No. 4

Issued September 1958

SOIL SURVEY

Curry County New Mexico

OUR SOIL ★ OUR STRENGTH

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
NEW MEXICO AGRICULTURAL EXPERIMENT STATION

How to Use THE SOIL SURVEY REPORT

THIS SURVEY of Curry County will help you plan the kind of farming that will protect your soils and provide good yields. It describes the soils, shows their location on a map, and tells what they will do under different kinds of management.

Find Your Farm on the Map

In using this survey start with the soil map, which consists of the 51 sheets bound in the back of this report. These sheets, if laid together, make a large photographic map of the county as it looks from an airplane. You can see towns, roads, large buildings, and many other landmarks on this map.

To find your farm on the large map, use the index to map sheets. This is a small map of the county on which numbered rectangles have been drawn to show where each sheet of the large map is located.

When you have found the map sheet for your farm, you will notice that boundaries of the soils have been outlined on the map and that there is a symbol for each kind of soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map.

Suppose you have found on your farm an area marked with the symbol Cd. You learn the name of the soil this symbol represents by looking at the map legend. The symbol Cd identifies Clovis loam, 0 to 2 percent slopes.

Learn About the Soils on Your Farm

Clovis loam, 0 to 2 percent slopes, and all other soils mapped are described in the section, Descriptions of the Soils. Soil scientists walked over the fields and rangelands. They dug holes and examined surface soils and subsoils. Slopes were measured with a hand level. Differences in growth of crops, weeds, or brush, and, in fact, all the things about the soils that might affect their suitability for farming were recorded.

As they mapped and studied the soils, the scientists talked with farmers and others about the use and management each soil should have. Then they placed it in a management group. A management group is a group of similar soils that need and respond to about the same kind of management.

Clovis loam, 0 to 2 percent slopes, is in management group 1. Turn to the section, Soil Management Groups, and read what is said about soils of group 1. Table 2 tells how much you can expect to harvest from Clovis loam, 0 to 2 percent slopes, and several other soils under two levels of management.

Management of soils when used for range is discussed in the section, Management of Rangeland. The soils are grouped into range sites, which are areas of native pasture, each of which has a given potential production of grasses and other vegetation. Clovis loam, 0 to 2 percent slopes, is in the Plains Upland range site.

Make a Farm Plan

For the soils on your farm, compare your yields and farm practices with those given in this report. Look at your fields for signs of runoff and erosion. Then decide whether or not you need to change your methods. The choice, of course, must be yours. This survey will aid you in planning new methods, but it is not a plan of management for your farm or any other farm in the county.

If you find that you need help in farm planning, consult the local representative of the Soil Conservation Service or the county agricultural agent. Members of the staff of your State experiment station and others familiar with farming in your county will also be glad to help you.

The soil survey of Curry County was made to provide a basis for the best agricultural uses of the land. Fieldwork was completed in 1953; it comprised a revision of a previous survey completed in 1941. Unless otherwise specifically mentioned, all statements in this report refer to conditions in 1953.

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SOIL SURVEY OF CURRY COUNTY, NEW MEXICO

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH NEW MEXICO AGRICULTURAL EXPERIMENT STATION

Contents

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General Nature of the Area

CURRY COUNTY, located in east-central New Mexico (fig. 1), covers an area of 1,403 square miles. It is the third smallest county in the State, but agriculturally it is one of the most important. Clovis is the county seat.

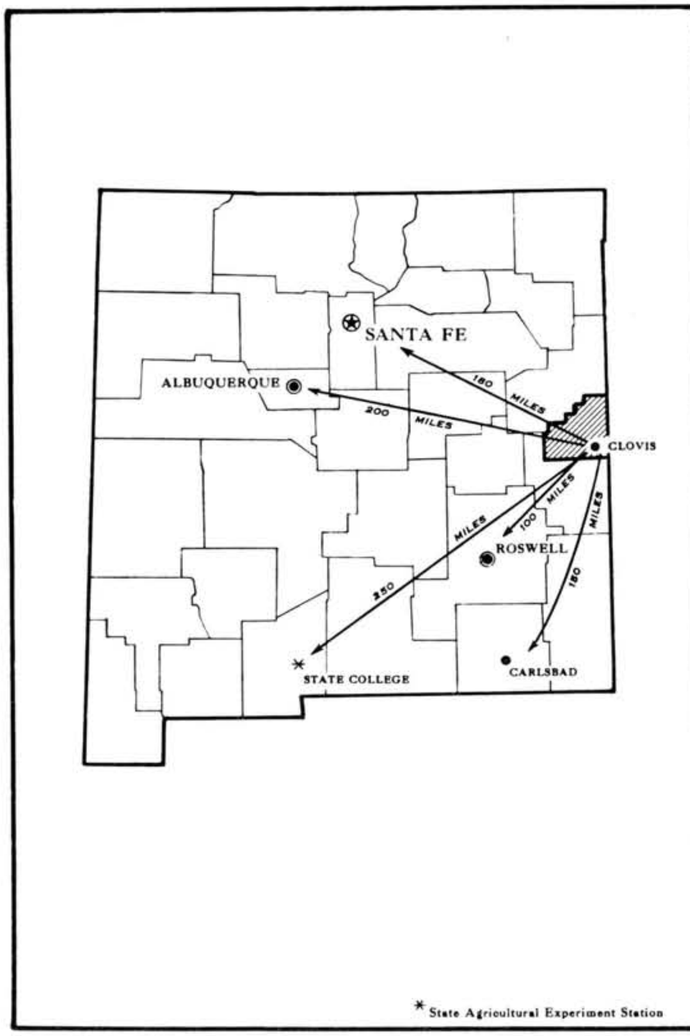

FIGURE 1.—Location of Curry County in New Mexico.

In 1541, the Spanish explorer, Coronado, led an expedition into the area that is now Curry County (*1*)[1]. He named the area *Llano Estacado,* that is, the Staked Plain.

During the latter part of the 19th century, large ranches were established in eastern New Mexico and western Texas. This area became one of the important cattle-producing sections in the United States.

The building of the Atchison, Topeka, and Santa Fe Railroad encouraged the settlement of the county. In 1906 officials of the railroad established a townsite (Clovis) to serve the ranch and farm area of eastern New Mexico. In 1909 Curry County was organized from parts of Roosevelt and Quay Counties, and Clovis was incorporated. The population of Clovis grew from 3,255 in 1910 to 17,318 in 1950.

The county has good transportation and marketing facilities. The railroad, 3 Federal highways, and 1 State highway pass through Clovis. There are 220 miles of hard-surfaced roads in the county.

The economy of the county is based on agriculture. Cattle ranching was once predominant, but dryland grain farming is now more important. In recent years irrigation farming has greatly increased. Small grains and grain sorghum are the most important cultivated crops.

Livestock raising is still important in the county. Clovis has excellent facilities for marketing livestock; it is one of the principal cattle-shipping centers in New Mexico. Curry County is also a leading producer of dairy and poultry products.

Soil Associations

The map of soil associations at the back of this report shows the general patterns of the soils in the county. Each association consists of two or more different soils, arranged in a characteristic pattern. The pattern is related to the shape of the land surface and the nature of the soil materials. Sometimes this kind of a general soil map is used to show areas of soils that are similar in economic value, that are suitable for a certain kind of crop, or that require similar practices to make good use of them or protect them from erosion.

In the descriptions of the soil associations only the major soils are listed. The soil association map shows only broad, general areas, not individual soils. Each area on the soil association map probably includes acreages of soils other than those listed. To find what individual soils are on a particular farm or ranch, use the detailed soil map.

Association I

Deep and moderately deep, smooth, medium-textured hardland (Pullman-Amarillo-Clovis loams).—This soil association, the most extensive in Curry County, occupies about 50 percent of the land area. These soils, known locally as "hardland," predominate in the northern two-thirds of the county. They occur on areas of smooth, nearly level to gently undulating relief, generally on slopes of slightly less than 1 percent. A few areas are on slopes of up to 5 percent.

The soils of this association have loam surface layers and compact, moderately fine textured subsoils. Normally, the depth to the white chalky zone is about 45 inches, but in approximately 8 percent of the total area, this zone begins at a depth of about 26 inches.

These soils are among the most productive in the county. Winter wheat, grown under dryland farming, is the principal cash crop. Rye, barley, and grain sorghum are also important. Because the climate is semiarid, yields of crops under dryland farming vary; if

[1] Italic numbers in parentheses refer to Literature Cited, p. 40.

there is enough precipitation, yields are high. These soils respond well to irrigation. High yields can be obtained if the soils are adequately irrigated and properly fertilized. Many areas, ranging in size from a few acres to several sections, are in native pasture.

Association II

Deep and moderately deep, moderately sandy row-crop land (Amarillo-Clovis fine sandy loams).—The soils of this association, locally called "sandy row-crop land," occur mainly in the southern part of the county. They occupy areas of smooth, nearly level relief. Most of the soils occur on slopes of less than 1 percent, but some are on slopes of slightly more than 5 percent. This association covers about 25 percent of the county.

In most places the depth to the chalky zone is more than 48 inches, but in about 9 percent of the total acreage, it begins at depths between 16 and 36 inches.

These soils are used mainly for row crops under dryland farming, but small areas throughout the association are used for native pasture. The principal crops are grain sorghum, sudangrass, and winter wheat. In dry years, yields under dryland farming are higher than on the finer textured hardland soils. If these soils are irrigated and fertilized, yields are high but not as high as on the Pullman-Amarillo-Clovis loams of Association I. These soils are highly erodible and must be protected to prevent damage from wind.

Association III

Deep and moderately deep, sandy row-crop land (Amarillo-Clovis loamy fine sands).—This association consists of sandy soils (row-crop land) that have permeable, medium-textured subsoils. The soils occur in the southern part of the county on gently sloping to undulating relief. They occupy about 6 percent of the total area.

Under dryland farming, row crops on soils of this association yield well if precipitation is above normal. Because an adequate vegetative cover cannot be maintained during extended droughts, wind erosion causes severe damage. Consequently, the soils are not well suited to continuous use for row crops.

These soils are difficult to irrigate, and their response to irrigation is rather poor. They are probably best suited to permanent pasture.

Association IV

Deep sandy land (Tivoli-Springer-Brownfield sands).—This association occurs in southwestern Curry County. It is comprised of soils of the sandhills and their associates. Relief ranges from smooth and nearly level to hilly and steep. This association occupies about 7 percent of the county.

These soils are too sandy to be suitable for cultivation. A few areas were once cropped, but after several years they became so severely damaged by wind erosion that cultivation was no longer practical. The soils are now used entirely for pasture. If properly managed they produce some of the highest forage yields in the county.

Association V

Moderately shallow and shallow calcareous soils (Mansker-Potter).—The soils of this association are widely distributed throughout the county. They normally occur on the sideslopes and upper margins of drainageways and playas. Some areas occur within broader, nearly level areas of deep, noncalcareous soils. Included in this association are the Drake soils. This association occupies about 10 percent of the county.

Most of this association is in native pasture which, if properly managed, affords good grazing. Only small areas that are closely associated with deeper soils are cultivated. Under dryland farming the Mansker soils are fairly productive. They do not respond to irrigation as well as the deeper, noncalcareous loamy soils. They are highly erodible and must be protected from wind.

Association VI

Flood plains (Spur-Alluvial land).—The soils of this association occur along the bottoms of the drainageways in the principal draws of the county. They occupy long, narrow strips, dissected in many places by drainage channels. They cover about 1 percent of the county area. These are young soils that have formed from soil materials washed from the surrounding areas. They are medium to moderately fine in texture. The profile development is weak to very weak.

Because the areas are small or inaccessible, these soils are not cultivated, even though they are probably fertile and potentially productive. All the areas are in native pasture.

Association VII

Calcareous sandy soils (Arch).—The gray shallow soils of this association are calcareous. They occupy nearly level areas in Blackwater Draw (Fidlers Draw) in the southwestern part of the county. A single area occurs in the northwestern part. This association occupies less than 1 percent of the county area.

The Arch soils are rather low in natural fertility. Nevertheless, because water is near the surface, several areas have been irrigated and used for cultivated crops with fair success. Most of the areas, however, are covered by native grasses, which produce fair to good yields of forage.

Association VIII

Intermittent lakes (Lofton-Church).—These fine-textured, grayish-brown to dark grayish-brown soils occur in the northeastern and southwestern parts of the county. They occupy low, nearly level or slightly

sloping benches above the bottoms of playas, and slight depressions within larger areas of Arch soils. The surface layers range from noncalcareous to strongly calcareous. The association occupies less than 1 percent of the county.

Two fields, consisting of areas of the Lofton soil, have been used for row crops under dryland farming with fair success. Most of the areas are small and somewhat inaccessible, however, so the soils are generally used for native pasture.

How a Soil Survey is Made

The scientist who makes a soil survey examines soils in the field, classifies the soils in accordance with facts that he observes, and maps their boundaries on an aerial photograph or other map.

FIELD STUDY.—The soil surveyor bores or digs many holes to see what the soils are like. The holes are not spaced in a regular pattern, but are located according to the lay of the land. Usually they are not more than a quarter of a mile apart, and sometimes they are much closer. In most soils each boring or hole reveals several distinct layers, called *horizons*, which collectively are known as the soil *profile*. Each horizon is studied to see how it differs from others in the profile and to learn the things about this soil that influence its capacity to support plant growth.

Color is usually related to the amount of organic matter present. The darker the surface soil, as a rule, the more organic matter it contains. Streaks and spots of gray, yellow, and brown in the lower layers generally indicate poor drainage and poor aeration.

Texture, or the content of sand, silt, and clay, is determined by the way the soil feels when rubbed between the fingers, and it is later checked by laboratory analysis. Texture determines how susceptible the soil is to wind erosion, how well it retains moisture, plant nutrients, and fertilizer, and whether it is easy or difficult to cultivate.

Structure, which is the way the individual soil particles are arranged in aggregates and the amount of pore space between aggregates, gives us clues to the ease or difficulty with which the soil is penetrated by plant roots and by moisture. The aggregates may have prismatic, columnar, blocky, platy, or granular structure (fig. 2).

Consistence, or the tendency of the soil to crumble or to stick together, indicates whether it is easy or difficult to keep the soil open and porous under cultivation.

Other characteristics observed in the course of the field study and considered in classifying the soil include the following: The depth of the soil over caliche or compact layers; the presence of gravel or stones in amounts that will interfere with cultivation; the steepness and pattern of slopes; the degree of erosion; the nature of the underlying parent material from which the soil has developed; and the acidity or alkalinity of the soil as measured by chemical tests.

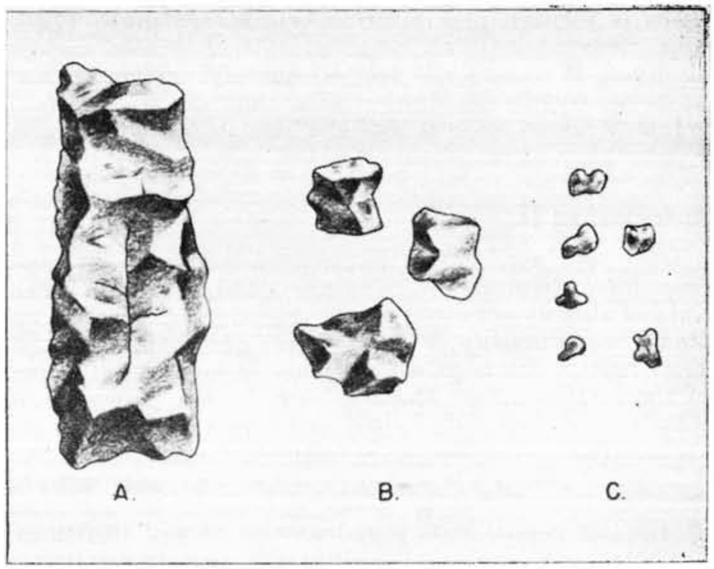

FIGURE 2.—Diagram showing some kinds of structure found in soils of Curry County: A, prismatic; B, blocky; C, granular.

CLASSIFICATION.—On the basis of the characteristics observed by the soil surveyors or determined by laboratory tests, soils are classified into phases, types, and series. The soil type is the basic classification unit. A soil type may consist of several mapping units. Types that resemble each other in most of their characteristics are grouped into soil series.

As an example of soil classification, consider the Potter series of Curry County. This series is made up of 2 soil types and 4 mapping units. Each mapping unit is a kind of soil that is shown on the map by a symbol and is described in this report. Types and mapping units in the Potter series in Curry County are:

Series	*Type*	*Mapping unit*
Potter	Fine sandy loam	0 to 5 percent slopes.
		5 to 20 percent slopes.
	Loam	0 to 5 percent slopes.
		5 to 20 percent slopes.

Soil type.—Soils similar in kind, thickness, and arrangement of soil layers are classified as one soil type.

Some soil types are divided into two or more units. Slope variations, frequency of rock outcrops, degree of erosion, depth of soil over the substratum, or natural drainage, are examples of characteristics that suggest dividing a soil type into different mapping units.

Soil series.—Two or more soil types that differ in texture of the surface layer, but are otherwise similar in kind, thickness, and arrangement of soil layers, are normally designated as a soil series. In a given area, however, it frequently happens that a soil series is represented by only one soil type. Each series is named for a place near which it was first mapped.

Miscellaneous land types.—Recent stream deposits, or rough, stony, and severely gullied land were not classified into types and series, but were identified by

descriptive names, such as Alluvial land, or Stony rough land, mixed materials.

Soil complex.—When two or more soils are so intricately associated in small areas that it is not feasible to show them separately on the soil map, they are mapped together and called a soil complex. The Tivoli-Arch-Potter complex is the only soil complex mapped in this county.

Other technical terms.—Additional terms used in the description of the soils of Curry County are defined in the glossary at the back of this report.

Descriptions of the Soils

In the following pages the soils and miscellaneous land types mapped in Curry County are described in detail.

The darker colored soils (brown to reddish brown) are highest in organic matter. These are generally cloddy loams that resist wind erosion. Pale-brown or grayish soils are high in lime (calcium carbonate). These soils are not cloddy and are highly susceptible to wind erosion. Yellowish-red or reddish-yellow soils are sandy. They contain little organic matter and are highly susceptible to wind erosion.

At the back of this report is a map that shows the location and distribution of each soil and land type in the county. The approximate acreage and proportionate extent of each mapping unit is given in table 1.

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent
	Acres	*Percent*
Alluvial land	2,232	0.2
Amarillo loam, 0 to 2 percent slopes	157,654	17.6
Amarillo loam, 2 to 5 percent slopes	13,846	1.5
Amarillo fine sandy loam, 0 to 2 percent slopes	129,255	14.4
Amarillo fine sandy loam, 2 to 5 percent slopes	12,409	1.4
Amarillo loamy fine sand, 0 to 2 percent slopes	45,385	5.1
Amarillo loamy fine sand, 2 to 5 percent slopes	4,648	.5
Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded	5,854	.6
Arch fine sandy loam	4,460	.5
Arch loamy fine sand	3,237	.4
Brownfield fine sand, 0 to 2 percent slopes	26,516	2.9
Brownfield fine sand, 0 to 2 percent slopes, wind eroded	1,430	.2
Church clay loam	2,986	.3
Clovis loam, 0 to 2 percent slopes	11,909	1.3
Clovis loam, 2 to 5 percent slopes	2,212	.2
Clovis fine sandy loam, 0 to 2 percent slopes	8,535	1.0
Clovis fine sandy loam, 2 to 5 percent slopes	1,918	.2
Clovis loamy fine sand, 0 to 2 percent slopes	8,621	1.0
Clovis loamy fine sand, 2 to 5 percent slopes	1,457	.2
Clovis loamy fine sand, 0 to 2 percent slopes, wind eroded	2,352	.3
Drake fine sandy loam, 2 to 10 percent slopes	2,906	.3
Drake loamy fine sand, 2 to 10 percent slopes	1,724	.2
Lofton clay loam	2,854	.3
Mansker loam, 0 to 2 percent slopes	21,556	2.4
Mansker loam, 2 to 5 percent slopes	39,162	4.4
Mansker loam, 5 to 10 percent slopes	14,220	1.6
Mansker fine sandy loam, 0 to 2 percent slopes	5,104	.5
Mansker fine sandy loam, 2 to 5 percent slopes	6,918	.8
Mansker fine sandy loam, 5 to 10 percent slopes	8,538	1.0
Mansker loamy fine sand, 0 to 2 percent slopes	1,552	.2
Potter loam, 0 to 5 percent slopes	3,636	.4
Potter loam, 5 to 20 percent slopes	2,823	.3
Potter fine sandy loam, 0 to 5 percent slopes	2,337	.3
Potter fine sandy loam, 5 to 20 percent slopes	341	(1)
Pullman loam, 0 to 2 percent slopes	242,217	27.0
Pullman loam, 2 to 5 percent slopes	6,770	.8
Pullman loam, thin solum, 0 to 2 percent slopes	17,035	1.9
Pullman loam, thin solum, 2 to 5 percent slopes	3,394	.4
Springer loamy fine sand, 0 to 2 percent slopes	14,500	1.6
Springer loamy fine sand, 2 to 5 percent slopes	1,732	.2
Spur clay loam	2,878	.3
Spur loam	3,183	.4
Stony rough land, mixed materials	4,015	.4
Stony rough land, Potter materials	2,167	.2
Tivoli fine sand	17,684	1.9
Tivoli-Arch-Potter complex	9,707	1.1
Playas	6,926	.8
Gravel pits, unclassified land	5,125	.5
Total	897,920	100.0

[1] Less than 0.1 percent.

Alluvial Land

This land type consists of medium textured to moderately coarse textured, young, alluvial soils. They occupy low terraces above the channels of major drainageways. These soils have formed from materials washed from higher lying areas of Mansker, Amarillo, and Pullman soils. They show little profile development, although in most places they are leached of lime to a depth of a few inches.

Range in characteristics.—In places the soils are calcareous to the surface; in other places they are noncalcareous to a depth of about 10 inches. This mapping unit contains small areas that consist of loamy fine sand throughout the profile. Stratified silt and fine sand occur below a depth of about 3 feet in many places.

Alluvial land (Aa).—In many places, this mapping unit occurs in association with the Spur soils, but it generally occupies slightly higher positions on the terraces.

Description of a typical profile, located in the SE¼ NW¼ sec. 32, T. 4 N., R. 36 E:

0 to 5 inches, brown[2] (10YR 5/3, dry; 10YR 3/3, moist), noncalcareous permeable fine sandy loam; weak granular structure; soft when dry, very friable when moist.

[2] Soil color names based on Munsell color charts as given in the Soil Survey Manual (*8*).

5 to 19 inches, similar to horizon above but calcareous.

19 to 38 inches, brown to dark-brown (10YR 4/3, dry; 10YR 3/3, moist), massive, very friable, strongly calcareous, permeable fine sandy loam; numerous white veins and streaks of lime.

38 inches +, strongly calcareous stratified loam and fine sandy loam, several feet deep.

Use and management.—This soil is all in native pasture. It is in management group 5 and in the Plains Upland site for range management.

Amarillo Soils

The Amarillo soils are the most extensive in Curry County and are among the best for agriculture. They have formed on medium textured to moderately coarse textured calcareous materials, probably alluvium reworked by wind. These soils have well-developed profiles. They resemble the Clovis soils but are deeper over lime, and in many places their B horizon has a slightly stronger structure.

The Amarillo series is represented in Curry County by three soil types—Amarillo loam, Amarillo fine sandy loam, and Amarillo loamy fine sand. The Amarillo loams resemble the Pullman loams with which they merge, but the structure of their B horizon is not so strongly developed, and their profile is sandier throughout. Except that they are less sandy and their surface layers are thinner, the Amarillo loamy fine sands are like the Brownfield fine sands with which they merge. The Amarillo loamy fine sands are less sandy and are better developed structurally than the Springer loamy fine sands.

Range in characteristics.—The Amarillo soils overlie a white chalky zone that begins at depths of 3 to 6 or more feet but that generally is at a depth of about 4 feet. From 40 to 70 percent of this zone is lime. The amount of lime in the profile above the chalky zone varies. The Amarillo fine sandy loams and loamy fine sands are deeper over calcareous material than the Amarillo loams. In places the Amarillo loamy fine sands are noncalcareous to within 1 or 2 inches of the chalky zone. Some areas of the Amarillo loams are calcareous at a depth of about 18 inches.

The color of the surface soil ranges from brown (10YR 5/3, dry) to reddish brown (5YR 5/3, dry) in the Amarillo loams, through yellowish red (5YR 5/6, dry) in the loamy fine sands. The color of the subsoil ranges from dark reddish brown (5YR 3/3, dry) in some areas of Amarillo loam to yellowish red (5YR 4/6, dry) in the loamy fine sands.

Amarillo loam, 0 to 2 percent slopes (Ad).—This soil, the second most extensive in Curry County, is exceeded in extent only by Pullman loam, 0 to 2 percent slopes. It normally occupies broad, smooth areas that are nearly level to gently sloping. Most of this soil occurs in the central part of the county.

Description of a representative profile, located in the SW¼NW¼ sec. 27, T. 3 N., R. 37 E:

A_1 0 to 6 inches, brown (7.5YR 5/4, dry; 7.5YR 4/4, moist), friable noncalcareous loam; moderate granular structure.

B_1 6 to 14 inches, reddish-brown (5YR 4/3, dry; 5YR 3/3, moist), friable to firm, noncalcareous, moderately permeable sandy clay loam; weak prismatic structure; breaks to weak blocky structure.

B_{21} 14 to 20 inches, reddish-brown (5YR 4/3, dry; 5YR 3/3, moist), firm and compact, noncalcareous clay loam; moderate prismatic structure; breaks to moderate blocky structure; moderately permeable to slowly permeable.

B_{22} 20 to 25 inches, reddish-brown (5YR 4/5, dry; 5YR 3/5, moist), firm, noncalcareous, moderately permeable sandy clay loam; weak prismatic structure; breaks to moderate blocky structure.

B_{3ca} 25 to 42 inches, reddish-brown (5YR 4/5, moist), friable, moderately permeable, calcareous sandy clay loam; weak granular structure; many streaks and veins of segregated lime (calcium carbonate) throughout.

C_{ca} 42 to 60 inches, white chalky zone that is more than 50 percent calcium carbonate; contains many hard lime nodules.

C 60 inches +, pink (5YR 8/4, dry; 5YR 6/4, moist), massive, very strongly calcareous sandy clay loam; moderately permeable.

Use and management.—This soil, used mainly for dryland farming, is generally planted to small grains and grain sorghum. Some areas are used for irrigation farming. The cultivated areas are in management group 1, and the many small areas in native pasture are in the Plains Upland range site.

Amarillo loam, 2 to 5 percent slopes (Ae).—Except that it occurs on stronger slopes, this soil resembles Amarillo loam, 0 to 2 percent slopes. It occupies small areas on slopes and low ridges throughout the central part of the county.

Use and management.—Because of its stronger slopes, this soil is not irrigated, but otherwise it is used in the same way as Amarillo loam, 0 to 2 percent slopes. It is in management group 1 and in the Plains Upland site for range management.

Amarillo fine sandy loam, 0 to 2 percent slopes (Ab).—This soil occupies broad, nearly level areas in the south-central part of the county. Its profile is well developed (fig. 3).

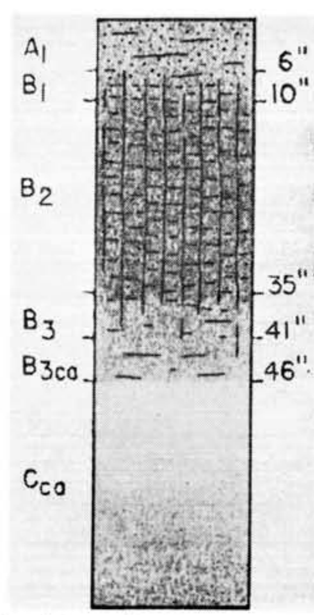

FIGURE 3.—Profile of Amarillo fine sandy loam, 0 to 2 percent slopes.

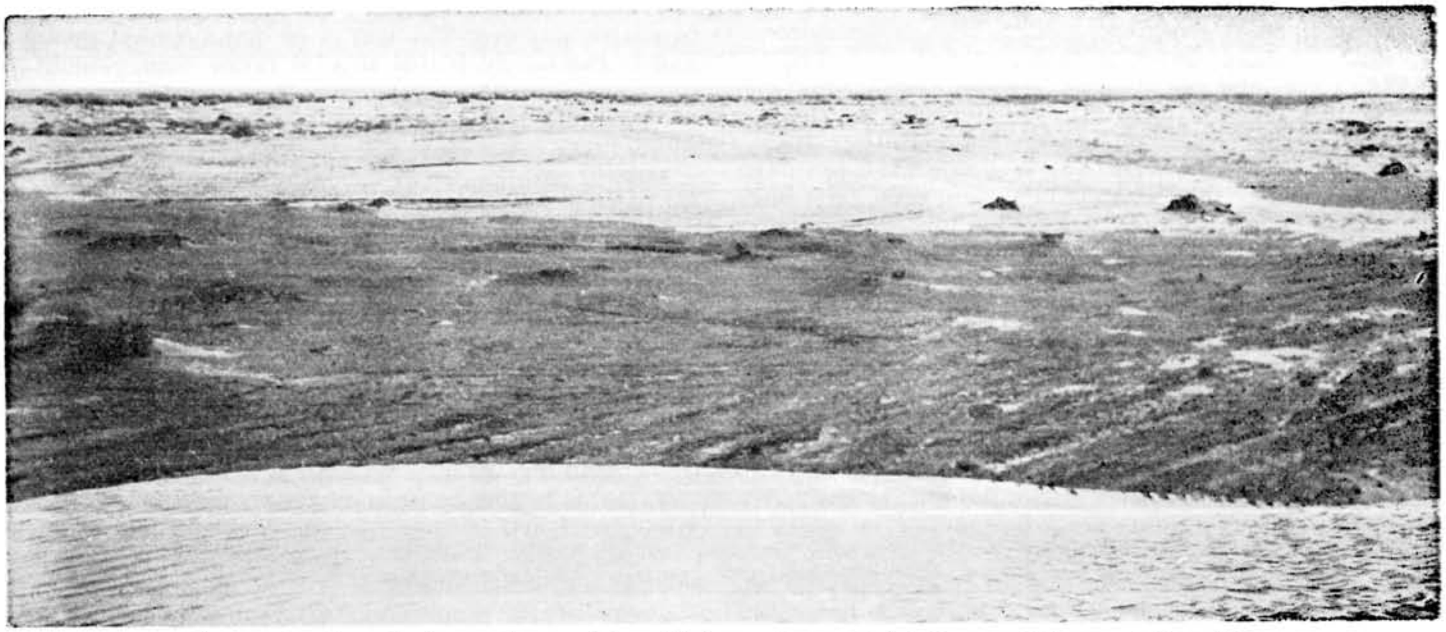

FIGURE 4.—Severely damaged area of Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded.

Description of a representative profile, located 1/4 mile south of NW corner, sec. 9, T. 1 N., R. 37 E:

A_1 0 to 6 inches, brown (7.5YR 5/5, dry; 7.5YR 4/4, moist), noncalcareous fine sandy loam; weak granular structure; moderately rapid permeability; soft when dry, very friable when moist.

B_1 6 to 10 inches, reddish-brown (5YR 4/4, dry; 5YR 3/4, moist), friable, noncalcareous, moderately permeable sandy clay loam; weak to moderate prismatic structure; breaks to weak blocky structure.

B_2 10 to 35 inches, reddish-brown (5YR 4/4, dry; 5YR 3/4, moist), friable, noncalcareous, moderately permeable sandy clay loam; moderate prismatic structure; breaks to weak to moderate blocky structure.

B_3 35 to 41 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), very friable, noncalcareous, moderately permeable fine sandy clay loam; weak blocky structure.

B_{3ca} 41 to 46 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), massive, calcareous very fine sandy clay loam; numerous veins and streaks of segregated lime; soft when dry, very friable when moist.

C_{ca} 46 inches +, white chalky zone; more than 50 percent calcium carbonate; many lime nodules.

Use and management.—Some areas of this soil are irrigated, but most of them are used to grow small grains and grain sorghum under dryland farming. The soil is in management group 2. The many small areas of native pasture are in the Sandy Plains site for range management.

Amarillo fine sandy loam, 2 to 5 percent slopes (Ac).—Except that it occupies undulating or strongly sloping topography, this soil is similar to Amarillo fine sandy loam, 0 to 2 percent slopes.

Use and management.—Because of its stronger slopes, this soil is not irrigated, but otherwise it is used in the same way as Amarillo fine sandy loam, 0 to 2 percent slopes. It is in management group 2 and in the Sandy Plains site for range management.

Amarillo loamy fine sand, 0 to 2 percent slopes (Ag).—This soil occupies broad, nearly level areas in the southern part of the county.

Description of a representative profile, located in SE1/4 sec. 20, T. 2 N., R. 34 E:

A_1 0 to 8 inches, yellowish-red (5YR 5/6 or 5YR 4/6, dry; 5YR 4/6, moist), loose to very friable, noncalcareous, rapidly permeable loamy fine sand; structureless (single grain).

B_2 8 to 21 inches, reddish-brown (5YR 4/4, dry; 5YR 3/4, moist), friable, noncalcareous, moderately permeable coarse sandy clay loam; weak prismatic structure; breaks to weak blocky structure.

B_3 21 to 44 inches, yellowish-red (5YR 5/6, dry; 5YR 4/4, moist), friable, noncalcareous, moderately permeable fine loam; weak granular structure.

B_{3ca} 44 to 50 inches, yellowish-red (5YR 5/6, dry; 5YR 4/4, moist), friable, massive, calcareous loam; numerous veins of segregated lime.

C_{ca} 50 to 60 inches +, white, chalky, massive loam similar to the C_{ca} horizons of the finer textured Amarillo soils.

C At depths below 5 feet, pink, massive, moderately permeable, strongly calcareous loam.

Use and management.—Cultivated areas of this soil are in management group 3. Areas in native pasture are in the Sandy Plains site for range management.

Amarillo loamy fine sand, 2 to 5 percent slopes (Ah).—Except that the relief is undulating or sloping, this soil resembles Amarillo loamy fine sand, 0 to 2 percent slopes.

Use and management.—This soil is used in the same way as Amarillo loamy fine sand, 0 to 2 percent slopes. It is in management group 3 and in the Sandy Plains site for range management.

Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded (Ak).—This soil is so severely eroded that it is not suited to cultivation, but otherwise it is similar to Amarillo loamy fine sand, 0 to 2 percent slopes. In most places, the topography is rough and hummocky. Numerous sand hummocks and dunes, several feet high, adjoin blown-out areas from which the surface soil has been removed by wind erosion (fig. 4).

Use and management.—This soil is in management group 7 and the Sandy Plains site for range management.

Arch Soils

The Arch soils are shallow, strongly calcareous, and generally grayish. These soils occur in the southwestern part of the county on broad flats, mainly in Blackwater Draw (Fidlers Draw). A single area is in the northwestern part of the county. The Arch soils have formed from medium-textured alluvium. They appear to have been modified by calcium carbonate deposited by ground water. The soils show little profile development.

The Arch soils are associated with the Tivoli, Springer, and Brownfield soils, which are noncalcareous and yellowish red. These associated soils occur on stronger slopes than the Arch soils. The Church soil occurs within the larger areas of Arch soils and is much finer textured than the Arch soils.

Range in characteristics.—The Arch soils are fairly uniform in Curry County. In a few places the depth to the chalky zone is about 25 inches.

Arch fine sandy loam (Am).—This soil occurs in the southwestern part of the county. The profile is weakly developed (fig. 5).

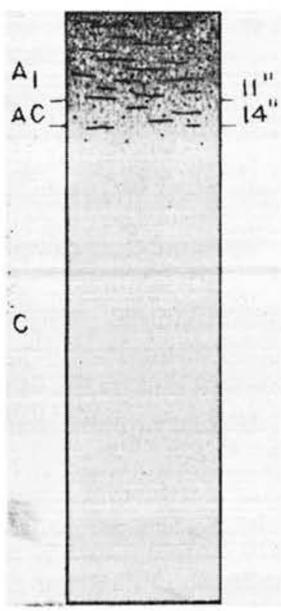

Figure 5.—Profile of Arch fine sandy loam.

Description of a representative profile, located in the SE corner of the SW¼ sec. 6, T. 1 N., R. 32 E:

A_1 0 to 11 inches, pale-brown (10YR 6/3, dry; 10YR 4/2, moist), calcareous fine sandy loam; weak granular structure; soft when dry, very friable when moist.

AC 11 to 14 inches, very pale brown (10YR 7/3, dry; 10YR 5/3, moist), friable, moderately permeable, strongly calcareous loam; weakly granular to massive; many fine veins and streaks of segregated lime.

C 14 to 60 inches +, white, soft, chalky material, high in lime; weakly granular in upper part, massive in lower part.

Use and management.—A few areas of these soils are cultivated under irrigation, but most of them are in native pasture. The soil is in management group 7 and in the Sandy Plains site for range management.

Arch loamy fine sand (An).—Except for the texture of the surface layer, this soil is similar to Arch fine sandy loam.

Use and management.—This soil is not suitable for cultivation. It is in management group 7 and in the Sandy Plains site for range management.

Brownfield Soils

The deep sandy Brownfield soils occur in the southwestern part of Curry County. They probably were developed from wind-deposited sands. In this county the Brownfield series is represented by only one type—Brownfield fine sand.

These soils closely resemble the Amarillo loamy fine sands, with which they merge. They differ mainly in having a deeper, sandier surface layer and a somewhat sandier texture throughout.

Areas of Springer soils, too small to be mapped separately, are included in the areas of Brownfield soils. The Brownfield soils have a finer textured, more compact subsoil than the Springer soils.

Range in characteristics.—The depth to the chalky zone ranges from about 4 to 9 feet, but in most places it is 5 or 6 feet. The surface layer ranges from 16 to 30 inches thick but in most places it is about 20 inches.

Brownfield fine sand, 0 to 2 percent slopes (Ba).—This smooth, nearly level to gently undulating soil occurs in southwestern Curry County. A typical profile is shown in figure 6.

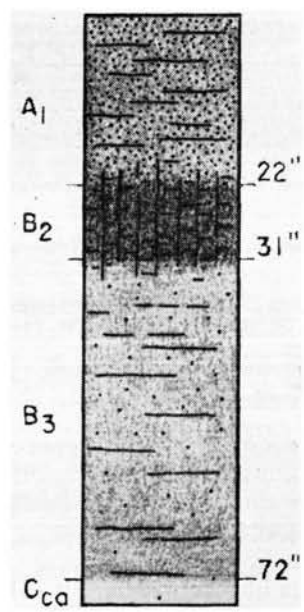

Figure 6.—Profile of Brownfield fine sand, 0 to 2 percent slopes.

Description of a representative profile, located 200 feet south and 300 feet west of the NE corner of sec. 13, T. 1 N., R. 34 E:

A_1 0 to 22 inches, yellowish-red (5YR 5/6, dry; 5YR 4/4, moist), loose, noncalcareous, rapidly permeable fine sand; structureless (single grain).

B_2 22 to 31 inches, reddish-brown (5YR 4/5, dry; 5YR 3/4, moist), friable, noncalcareous, moderately permeable sandy clay loam; weak prismatic structure; breaks to moderate granular.

B_3 31 to 72 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), very friable, noncalcareous, massive coarse sandy clay loam; fine sandy loam in lower part.

C_{ca} 72 inches +, white chalky zone similar to the material in the C_{ca} horizon of the Amarillo soils; chalky zone is several feet thick; becomes pink in color and contains less lime in lower part.

Use and management.—Because this soil is very sandy, it is not cultivated. It is in management group 8 and in the Deep Sand site for range management.

Brownfield fine sand, 0 to 2 percent slopes, wind eroded (Bb).—Except that the relief is hummocky or billowy and much of the surface soil has been lost through erosion, this soil is like Brownfield fine sand, 0 to 2 percent slopes. Accumulations of sand, several feet thick, adjoin blown-out spots in which the subsoil is exposed. Many of these areas are actively eroding.

Use and management.—This soil is not cultivated. It is in management group 10 and in the Deep Sand site for range management.

Church Soils

The gray, strongly calcareous Church soils, represented in Curry County by Church clay loam, are slowly drained. They normally occupy low, nearly level benches next to the bottoms of playas. They occur in association with the darker colored, noncalcareous Lofton soils. Most of the areas are in the eastern and northern parts of the county. Several small areas occur in the southwestern part in slight depressions within larger areas of Arch soils.

Range in characteristics.—These soils are fairly uniform in characteristics. The subsoil ranges from a clay to a clay loam.

Church clay loam (Ca).—This inextensive soil normally occurs in small crescent-shaped areas. A typical profile is illustrated in figure 7.

Description of a representative profile, located in the SE¼ sec. 22, T. 7 N., R. 35 E:

A_1 0 to 17 inches, grayish-brown (2.5Y 5/2) calcareous clay loam; soft when dry and friable when moist; moderate granular structure in the upper part; firm and moderate blocky in the lower part.

C_{ca} 17 to 38 inches, light brownish-gray (2.5Y 6/2), plastic, very strongly calcareous clay; moderate to strong blocky structure; very slowly permeable.

C 38 to 60 inches +, grayish-brown (2.5Y 5/2) strongly calcareous clay; strong blocky structure; very slowly permeable; very firm when moist, plastic when wet; numerous yellow mottlings of iron and white veins of segregated lime.

Use and management.—This soil is not suited to cultivation and is all in native pasture. It is in management group 9 and in the Heavy Bottom-land site for range management.

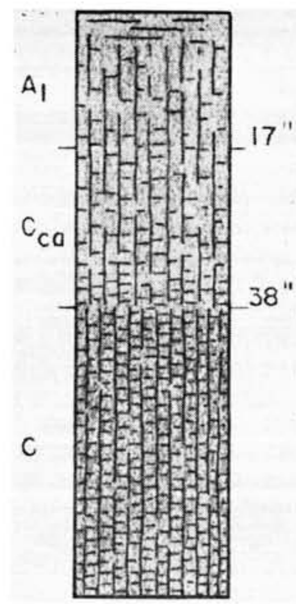

FIGURE 7.—Profile of Church clay loam.

Clovis Soils

These soils generally occur in small areas within broader areas of Amarillo soils. They occupy the upper margins of many of the draws and playas. The Clovis soils are similar to the Amarillo, but the chalky zone occurs at shallower depths (16 to 36 inches), and in many places the profile is not so well developed.

In Curry County the Clovis series is represented by three soil types—Clovis loam, Clovis fine sandy loam, and Clovis loamy fine sand. The Clovis loams resemble the thin solum phases of the Pullman loams, except for weaker structural development in the B horizon.

Range in characteristics.—Depth to chalk ranges from 16 inches, where the Clovis soils merge with the Mansker soils, to 36 inches, where the Clovis soils merge with the Amarillo soils. In most places the depth to chalk is about 28 inches. In a few places the soil is shallower than in the typical profile and is mildly calcareous to the surface. The Clovis loamy fine sands are deeper to calcareous material than the loams and fine sandy loams. In places the loamy fine sands are noncalcareous to within an inch of the chalky zone.

In places, small scattered lenses of hard, rocklike caliche occur throughout the chalky zone. The range of color of the Clovis soils is about the same as that of the Amarillo soils.

Clovis loam, 0 to 2 percent slopes (Cd).—This soil occurs in association with the Amarillo loams in the central part of the county.

Description of a representative profile, located 1,200 feet west and 200 feet north of the SE corner of sec. 31, T. 3 N., R. 35 E:

A_1 0 to 5 inches, brown (7.5YR 5/4, dry; 7.5YR 4/4, moist), friable, noncalcareous loam; moderate granular structure.

B_1 5 to 11 inches, similar to A_1 horizon but contains slightly more clay; weak blocky structure that breaks to moderate granular structure.

B_2 11 to 23 inches, reddish-brown (5YR 4/3, moist), firm, noncalcareous, moderately permeable clay loam; moderate prismatic and moderate blocky structure.

B_3 23 to 27 inches, reddish-brown (5YR 5/5, dry; 5YR 4/5, moist), friable, calcareous, moderately permeable clay loam; weak granular structure; contains veins of segregated lime.

C_{ca} 27 to 60 inches, white chalky zone very similar to the C_{ca} horizons in the Amarillo soils.

C 60 inches +, pink, friable, permeable loam; contains less lime than layer immediately above.

Use and management.—This soil is used mainly to grow winter wheat and grain sorghum under dryland farming. Some of it is cultivated under irrigation. It is in management group 1. The small scattered areas of native pasture are in the Plains Upland site for range management.

Clovis loam, 2 to 5 percent slopes (Ce).—Except that this inextensive soil occupies stronger slopes, it is similar to Clovis loam, 0 to 2 percent slopes. It normally occurs on the upper slopes of playas and draws.

Use and management.—Because of its stronger slopes, this soil is not irrigated. Otherwise it is used in the same way as Clovis loam, 0 to 2 percent slopes. It is in management group 1 and in the Plains Upland site for range management.

Clovis fine sandy loam, 0 to 2 percent slopes (Cb).—This soil occurs in the central part of the county, in association with the Amarillo fine sandy loams.

Description of a representative profile, located in the NW¼NW¼ sec. 10, T. 1 N., R. 37 E:

A_1 0 to 6 inches, reddish-brown (5YR 5/3, dry; 5YR 4/3, moist), very friable, noncalcareous fine sandy loam; weak granular structure; moderately rapid permeability.

B_1 6 to 11 inches, reddish-brown (5YR 5/3, dry; 5YR 4/3, moist), very friable, noncalcareous, moderately permeable fine sandy clay loam; weak prismatic and weak blocky structure.

B_2 11 to 18 inches, reddish-brown (5YR 4/3, dry; 5YR 3/3, moist), friable, noncalcareous, moderately permeable sandy clay loam; moderate prismatic and weak blocky structure.

B_3 18 to 28 inches, reddish-brown (5YR 5/4, dry; 5YR 4/4, moist), very friable, calcareous, moderately permeable sandy clay loam; weak granular structure; many veins and streaks of lime.

C_{ca} 28 to 56 inches, white, chalky, extremely calcareous zone.

C 56 inches +, massive, moderately permeable, very strongly calcareous loam.

Use and management.—This soil is used mainly for dryland farming. Grain sorghum is the principal crop, but winter wheat and sudangrass are also grown. Some areas are cultivated under irrigation. This soil is in management group 2. The small scattered areas of native pasture are in the Sandy Plains site for range management.

Clovis fine sandy loam, 2 to 5 percent slopes (Cc).—Except that it occupies stronger slopes, this inextensive soil is similar to Clovis fine sandy loam, 0 to 2 percent slopes. It occurs on low ridges and on the upper slopes of draws and playas.

Use and management.—This soil is in management group 2 and in the Sandy Plains site for range management. It is generally not irrigated, but otherwise it is used in the same way as Clovis fine sandy loam, 0 to 2 percent slopes.

Clovis loamy fine sand, 0 to 2 percent slopes (Cg).—This soil occurs in small areas in association with Amarillo loamy fine sands.

Description of a representative profile, located 800 feet south and 50 feet east of the NW corner of sec. 3, T. 1 N., R. 34 E:

A_1 0 to 9 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), loose, noncalcareous, rapidly permeable loamy fine sand; structureless (single grain).

B_2 9 to 16 inches, reddish-brown to yellowish-red (5YR 4/5, dry; 5YR 3/5, moist), friable, noncalcareous, moderately permeable coarse sandy clay loam; weak prismatic and weak blocky structure.

B_3 16 to 27 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), friable, noncalcareous, moderately permeable coarse sandy clay loam; massive to weak granular structure.

C_{ca} 27 to 48 inches +, white chalky zone very similar to C_{ca} horizon of finer textured Clovis soils.

Use and management.—This soil is in management group 3. Areas in native pasture are in the Sandy Plains site for range management.

Clovis loamy fine sand, 2 to 5 percent slopes (Ch).—Except that it occupies stronger slopes, this soil is like Clovis loamy fine sand, 0 to 2 percent slopes.

Use and management.—This soil is in management group 3 and in the Sandy Plains site for range management. It is used in the same way as Clovis loamy fine sand, 0 to 2 percent slopes.

Clovis loamy fine sand, 0 to 2 percent slopes, wind eroded (Ck).—This soil closely resembles Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded. It has been wind eroded to the extent that it is no longer suitable for cultivation. It consists of sandy hummocks and dunes, several feet high, that lie next to blown-out areas that have eroded into the subsoil. In some places all the subsoil has been blown away and the chalky substratum is exposed.

Use and management.—This soil is in management group 7 and in the Sandy Plains site for range management.

Drake Soils

The Drake soils are strongly calcareous. They occupy low dunes formed from wind-deposited materials that have been blown from areas of the Arch soils and, to a lesser extent, from areas of the Church soils. Because the prevailing winds are from the southwest, the Drake soils occupy the leeward margins (east and northeast) of areas of Arch and Church soils. The Drake soils are inextensive. They occur mainly in the southwestern part of the county. They are sandy or moderately sandy in texture and have a weakly developed profile.

Range in characteristics.—In most areas of Drake soils, the amount of lime varies throughout the profile, generally increasing with depth. In some places, however, the lime content is uniform throughout. The texture is normally uniform to depths of 10 or more feet, but in some areas the lower part of the profile contains slightly more clay.

Two small areas of soils that are loam textured throughout occur in the northern part of the county.

Because they are inextensive, these soils are mapped as Drake fine sandy loam, 2 to 10 percent slopes.

Drake fine sandy loam, 2 to 10 percent slopes (Da).—Most of this soil occurs in the southwestern part of Curry County.

Description of a representative profile, located in the SE¼NW¼ sec. 32, T. 2 N., R. 32 E:

0 to 16 inches, pale-brown (10YR 6/3, dry; 10YR 5/3, moist), strongly calcareous, permeable fine sandy loam; massive to weak granular structure; soft when dry, very friable when moist.

16 to 72 inches +, very pale brown (10YR 7/3, dry; 10YR 6/3, moist), massive, permeable, strongly calcareous fine sandy loam; soft when dry, very friable when moist.

Use and management.—This soil is not cultivated. It is in management group 8 and in the Deep Sand site for range management.

Drake loamy fine sand, 2 to 10 percent slopes (Db).—This soil is sandier than Drake fine sandy loam, 2 to 10 percent slopes.

Profile description:

0 to 27 inches, light-gray (10YR 7/2, dry; 10YR 6/2, moist), loose, strongly calcareous, rapidly permeable loamy fine sand; structureless (single grain).

27 to 34 inches, white (10YR 8/2, dry; 10YR 7/2, moist), massive, very strongly calcareous sandy loam; very friable when moist, soft when dry; numerous soft concretions of lime.

34 to 72 inches +, very pale brown (10YR 7/3, dry; 10YR 6/3, moist), loose, strongly calcareous, rapidly permeable loamy fine sand; structureless (single grain).

Use and management.—This soil is not cultivated. It is in management group 10 and in the Deep Sand site for range management.

Lofton Soils

The Lofton soils, represented in Curry County by Lofton clay loam, are dark grayish brown, slowly permeable, and noncalcareous. They normally occupy low benches next to the bottoms of playas. Most of the areas are in the northern half of the county in association with areas of Church, Mansker, and Pullman soils.

The Lofton soils occupy topographic positions similar to those occupied by the Church soil, but they are darker colored than the Church soil and are noncalcareous. They have formed from moderately fine textured materials that probably were washed from higher lying soils. They are highly weathered as a result of the accumulation of runoff water.

Range in characteristics.—The texture of the subsoil ranges from clay to clay loam, and the structure from moderate blocky to strong blocky. The thickness of the profile above the parent material ranges from about 20 to 50 inches. Some of the shallower profiles are mildly calcareous to the surface. In places a thin mantle of recent overwash, 1 to 2 inches thick, covers the surface. This mantle is normally brown, friable, and calcareous.

Lofton clay loam (La).—Only small areas of this soil occur in Curry County. The profile is well developed (fig. 8).

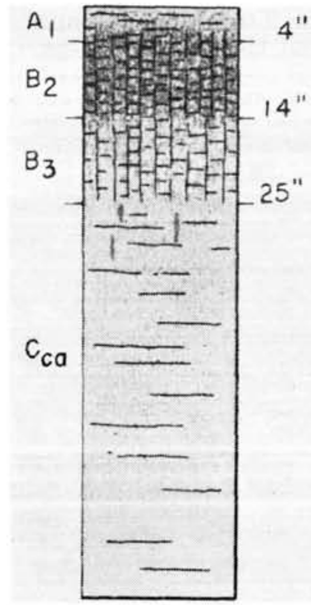

FIGURE 8.—Profile of Lofton clay loam.

Description of a representative profile, located in the NW¼SE¼ sec. 12, T. 8 N., R. 35 E:

A_1 0 to 4 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist), friable, noncalcareous, moderately permeable clay loam; moderate granular structure.

B_2 4 to 14 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist), slowly permeable, noncalcareous silty clay; strong blocky structure; firm when moist, plastic when wet; surfaces of aggregates coated with a shiny film of fine clay (clay skins).

B_3 14 to 25 inches, grayish-brown (10YR 5/2, dry; 10YR 3.5/2, moist), firm, calcareous, slowly permeable silty clay; weak to moderate blocky structure; contains veins and streaks of segregated lime.

C_{ca} 25 to 50 inches +, brown (7.5YR 5/4, dry; 7.5YR 4/4, moist), friable, massive to weak granular, strongly calcareous clay loam.

Use and management.—Most of this soil is in native grass and is used for grazing. Several small areas are used for row crops. The soil is in management group 9 and in the Heavy Bottom-land site for range management.

Mansker Soils

Mansker soils are strongly calcareous. They normally occupy the slopes of draws and playas. Small, nearly level to gently sloping areas, however, occur within larger areas of Pullman, Amarillo, and Clovis soils. The Mansker soils are extensive throughout Curry County. They have formed where the upper part of some other soil has been lost through erosion and the strongly calcareous substratum has been exposed. These soils show very little profile development.

Range in characteristics.—The color of the surface soil is grayish brown to brown. Normally the texture is fairly uniform throughout the profile, but in places the texture is loam, sandy clay loam, or clay loam.

Mansker loam, 2 to 5 percent slopes (Me).—This is the most extensive of the Mansker soils. It is generally the predominant soil along the slopes of drainageways and playas. A typical profile of Mansker loam is shown in figure 9.

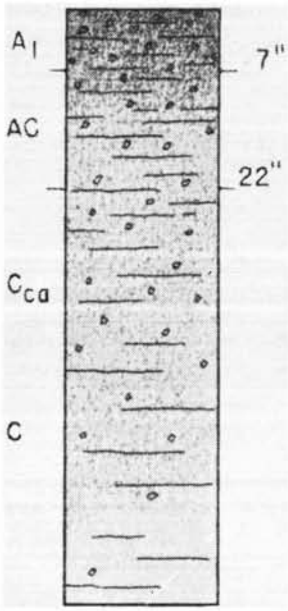

FIGURE 9.—Profile of Mansker loam, 2 to 5 percent slopes.

Description of a representative profile, located in the NW¼ sec. 8, T. 3 N., R. 37 E:

A_1 0 to 7 inches, brown (10YR 5/3, dry; 10YR 4/3, moist), friable, calcareous loam; weak granular structure.

AC 7 to 22 inches, light-brown (7.5YR 6/4, dry; 7.5YR 5/4, moist), friable, moderately permeable, strongly calcareous loam; weak granular structure.

C_{ca} 22 to 40 inches +, pink to reddish-yellow (7.5YR 7/5, dry; 7.5YR 6/6, moist), friable, very strongly calcareous, massive, moderately permeable loam.

Use and management.—This soil is not cultivated but is one of the more important range soils of the county. It is in management group 5 and in the Plains Upland site for range management.

Mansker loam, 0 to 2 percent slopes (Md).—Except that is it nearly level, this soil is similar to Mansker loam, 2 to 5 percent slopes. It generally occupies rather small areas within broader, nearly level areas of Pullman, Amarillo, and Clovis soils. It occurs commonly throughout the northern two-thirds of the county.

Use and management.—Many small areas of this soil are cultivated with the associated deeper soils. This soil is in management group 4. The areas in native pasture are in the Plains Upland site for range management.

Mansker loam, 5 to 10 percent slopes (Mg).—Except that it occupies stronger slopes, this soil is similar to Mansker loam, 2 to 5 percent slopes.

Use and management.—This soil is not cultivated. It is in management group 5 and in the Plains Upland site for range management.

Mansker fine sandy loam, 0 to 2 percent slopes (Ma).—Except that its surface layer is fine sandy loam, this soil resembles Mansker loam, 0 to 2 percent slopes. Most of it occupies rather small areas within broader, nearly level areas of Amarillo and Clovis fine sandy loams. Some areas occur along the upper margins of the slopes of draws and playas.

Use and management.—Small areas of this soil are cultivated with the associated deeper soils. This soil is in management group 4. Areas in native pasture are in the Sandy Plains site for range management.

Mansker fine sandy loam, 2 to 5 percent slopes (Mb).—This soil occupies stronger slopes but is otherwise similar to Mansker fine sandy loam, 0 to 2 percent slopes.

Use and management.—All of this soil is used for grazing. It is in management group 7 and in the Sandy Plains site for range management.

Mansker fine sandy loam, 5 to 10 percent slopes (Mc).—This soil occupies the stronger slopes of draws and playas. Otherwise, it is like the less strongly sloping Mansker fine sandy loams.

Use and management.—All of this soil is used for grazing. It is in management group 7 and in the Sandy Plains site for range management.

Mansker loamy fine sand, 0 to 2 percent slopes (Mh).—Except that it is sandier and less calcareous throughout, this soil is similar to the Mansker fine sandy loams. It occurs in association with deep sandy soils in the southwestern part of the county.

Description of a representative profile, located in the NE¼SE¼ sec. 18, T. 2 N., R. 32 E:

A_1 0 to 6 inches, brown (10YR 5/3, dry; 10YR 4/3, moist), rapidly permeable, mildly calcareous loamy fine sand; weak granular to single grain structure; soft when dry, very friable to loose when moist.

AC 6 to 16 inches, brown to dark-brown (10YR 4/3, dry; 10YR 3/3, moist), very friable, massive, strongly calcareous, permeable fine sandy loam; many small pebbles of caliche and mixed sedimentary rock.

C_{ca} 16 to 36 inches +, pale brown to very pale brown (10YR 6.5/3, dry; 10YR 5/3, moist), friable, massive, very strongly calcareous loam; many streaks of segregated lime.

Use and management.—This soil is entirely in native pasture. It is in management group 7 and in the Sandy Plains site for range management.

Potter Soils

The Potter soils are shallow and strongly calcareous. They overlie hard, consolidated caliche. The degree of cementation in the caliche varies. In some places the caliche resembles limestone; in others it consists of lime-cemented pebbles and nodules. The material from which these soils developed was mainly weathered caliche, but it was intermixed with wind-deposited materials. The Potter soils occur throughout the county, normally in areas of less than 100 acres. In many places they are closely associated with the Mansker soils.

Range in characteristics.—The depth to caliche ranges from 2 to about 12 inches. Most of the caliche underlying the Potter soils is rocklike, but there are small areas of partially cemented caliche that can be

broken with a spade. The thickness of the caliche ranges from 6 inches to 10 feet or more. The upper part of this layer is generally fractured; in places where the layer is thin, it may be fractured throughout.

Potter loam, 0 to 5 percent slopes (Pc).—The profile of this shallow soil is weakly developed (fig. 10).

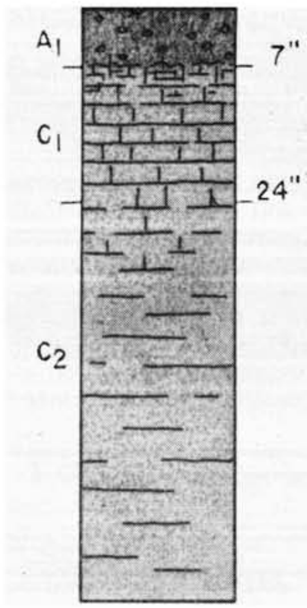

FIGURE 10.—Profile of Potter loam, 0 to 5 percent slopes.

Description of a representative profile, located in the NE¼ NE¼ sec. 30, T. 4 N., R. 36 E:

A_1 0 to 7 inches, grayish-brown (10YR 5/2, dry; 10YR 4/2, moist), friable, calcareous loam; weak granular structure; many small pebbles of caliche.

C_1 7 to 24 inches, white, hard or indurated caliche fractured in the upper few inches.

C_2 24 inches +, very pale brown (10YR 7/3, dry; 10YR 6/3, moist) partially cemented caliche that becomes softer with increasing depth.

Use and management.—Most of this soil is in native pasture and is used for grazing. A few small scattered spots within areas of deeper soils are cultivated. Some areas of this soil and other Potter soils have been excavated for gravel and caliche. The rock and the softer marl materials are used for roadbeds and other construction purposes. This soil is in management group 6 and in the Shallow Upland site for range management.

Potter loam, 5 to 20 percent slopes (Pd).—This soil occupies stronger slopes than Potter loam, 0 to 5 percent slopes; in some places the surface layer is thinner and contains many large fragments of caliche. Otherwise the soil is similar to Potter loam, 0 to 5 percent slopes.

Use and management.—This soil is used in the same way as Potter loam, 0 to 5 percent slopes. It is in management group 6 and in the Shallow Upland site for range management.

Potter fine sandy loam, 0 to 5 percent slopes (Pa).—Except that its surface layer is sandier, this soil resembles Potter loam, 0 to 5 percent slopes.

Use and management.—This soil is used in the same way as Potter loam, 0 to 5 percent slopes. It is in management group 6 and in the Shallow Upland site for range management.

Potter fine sandy loam, 5 to 20 percent slopes (Pb).—Except for stronger slopes, this inextensive soil is like Potter fine sandy loam, 0 to 5 percent slopes.

Use and management.—This soil is used in the same way as Potter loam, 0 to 5 percent slopes. It is in management group 6 and in the Shallow Upland site for range management.

Pullman Soils

The Pullman soils are the second most extensive soils in Curry County. They comprise the largest part of the hardland wheat soils. These soils occur mainly in the northern half of the county on broad, smooth areas that are nearly level to gently sloping. They have developed from fine-textured, calcareous materials that probably were deposited by wind.

Range in characteristics.—In the thin-solum phases of Pullman loam, the depth to the chalky zone ranges from about 16 to 36 inches. In the other Pullman loams, depth to this zone ranges from 36 to 60 inches. From 30 to 60 percent of the material in this zone is lime. The calcareous material occurs at a depth of about 12 inches in some areas of the thin-solum phases and at about 30 inches in the other Pullman loams.

Pullman loam, 0 to 2 percent slopes (Pe).—This is the most extensive soil in Curry County. It normally occupies broad, smooth areas, many of which extend across several sections. Most of it is on slopes of slightly less than 1 percent. A typical profile is illustrated in figure 11.

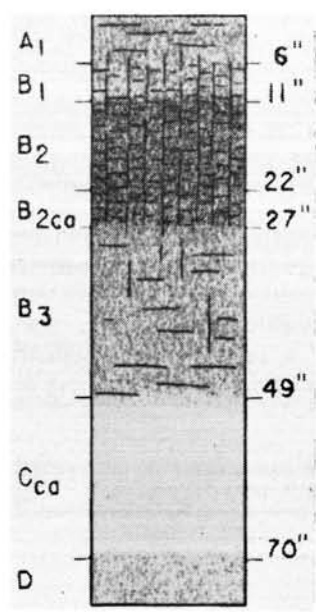

FIGURE 11.—Profile of Pullman loam, 0 to 2 percent slopes.

Description of a representative profile, located in the SW¼NW¼ sec. 6, T. 4 N., R. 36 E:

A_1 0 to 6 inches, brown (7.5YR 5/4, dry; 7.5YR 3/4, moist), friable, noncalcareous, moderately permeable loam; moderate granular structure.

B_1 6 to 11 inches, brown (7.5YR 5/4, dry; 7.5YR 3/4, moist), friable, noncalcareous fine loam; weak blocky structure.

B_2 11 to 22 inches, dark reddish-brown (5YR 3/2.5, dry; 5YR 3/2, moist), firm, compact, slowly permeable, noncalcareous clay loam; weak to moderate prismatic structure; breaks to strong blocky structure; structure less distinct when the soil is moist; surfaces of aggregates coated with a dark, shiny film of fine clay (clay skin).

B_{2ca} 22 to 27 inches, reddish-brown (5YR 4/4, dry; 5YR 3/4, moist), firm, compact, calcareous, slowly permeable clay loam; moderate blocky structure that becomes less distinct in the lower part; veins of lime throughout.

B_3 27 to 49 inches, reddish-brown to yellowish-red (5YR 5/5, dry; 5YR 4/5 moist), friable, strongly calcareous, moderately permeable clay loam; weak granular structure; becomes massive in lower part.

C_{ca} 49 to 70 inches, pink (7.5YR 8/4, dry; 7.5YR 7/4, moist), friable, massive, moderately permeable, extremely calcareous material.

D 70 inches +, substratum becomes less calcareous and contains more sand than the C_{ca} horizon; D horizon is believed to be unrelated genetically to rest of soil material in the profile.

Use and management.—Most of this soil is used to grow small grains and grain sorghum under dryland farming. Some areas are cultivated under irrigation. This soil is in management group 1. The many small areas of native pasture are in the Plains Upland site for range management.

Pullman loam, 2 to 5 percent slopes (Pg).—This inextensive soil is similar to Pullman loam, 0 to 2 percent slopes, except that it occurs on stronger slopes. It normally occupies small, narrow areas along the uppermost parts of the slopes of playas and small draws.

Use and management.—This soil is used in the same way as Pullman loam, 0 to 2 percent slopes, except that it is not cultivated under irrigation. It is in management group 1 and in the Plains Upland site for range management.

Pullman loam, thin solum, 0 to 2 percent slopes (Ph).—Except that it has somewhat thinner horizons and is shallower over the calcareous material, this soil is similar to Pullman loam, 0 to 2 percent slopes. In some places it has slightly weaker structural development than the deeper Pullman soils. Most areas of this soil are rather small and occur within broader areas of the deeper Pullman loams.

Description of a representative profile, located 200 feet west of the center of the NE¼NW¼ sec. 22, T. 5 N., R. 35 E:

A_1 0 to 6 inches, brown (7.5YR 5/4, dry; 7.5YR 3/4, moist), friable, noncalcareous, moderately permeable loam; weak granular structure.

B_2 6 to 17 inches, dark reddish-brown (5YR 3/3, moist), firm, compact, noncalcareous, slowly permeable clay loam; weak prismatic structure; breaks to moderate to strong blocky structure; aggregates covered by clay skins.

B_{2ca} 17 to 22 inches, yellowish-red (5YR 4/6, dry; 5YR 4/4, moist), firm, calcareous clay loam; medium blocky structure; moderately slow permeability; segregated veins of lime throughout.

B_3 22 to 26 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), friable, massive, calcareous, moderately permeable clay loam.

C_{ca} 26 to 41 inches, pink (5YR 8/4, dry), chalky, massive horizon containing lime and similar to the C_{ca} horizon of Pullman loam, 0 to 2 percent slopes.

D 41 inches +, pink loamy substratum; contains less lime and more sand than the C_{ca} horizon; D horizon probably unrelated to soil materials in the rest of the profile.

Use and management.—This soil is used in the same way as Pullman loam, 0 to 2 percent slopes. It is in management group 1 and in the Plains Upland site for range management.

Pullman loam, thin solum, 2 to 5 percent slopes (Pk).—This inextensive soil is similar to Pullman loam, thin solum, 0 to 2 percent slopes, except that it occupies stronger slopes. It occurs along the upper slopes of playas and small draws.

Use and management.—This soil is not irrigated, but otherwise it is used in the same way as Pullman loam, thin solum, 0 to 2 percent slopes. It is in management group 1 and in the Plains Upland site for range management.

Springer Soils

The Springer soils are deep, well drained, rapidly permeable, and noncalcareous. These soils occur in the southwestern part of the county. They have developed on sandy sediments deposited by wind. These soils show more profile development than the associated Tivoli soils. They have coarser textured subsoils and less distinct profiles than the Amarillo soils. The Springer series is represented in Curry County by one soil type—Springer loamy fine sand.

Range in characteristics.—The depth to the chalky zone varies from about 2½ to 6 feet, but in most places it occurs at depths of 4 to 5 feet. Typically, this zone is similar to that underlying the Amarillo and Clovis soils; in a few places it consists of extremely calcareous sand.

Springer loamy fine sand, 0 to 2 percent slopes (Sa).—This soil occurs on smooth to slightly hummocky topography. A typical profile is illustrated in figure 12.

Description of a representative profile, located in the NE¼SE¼ sec. 30, T. 2 N., R. 32 E:

A_1 0 to 17 inches, reddish-brown to yellowish-red (5YR 5/5, dry; 5YR 4/5, moist), very friable, noncalcareous, rapidly permeable loamy fine sand; loose and single grained in the upper part; very weak granular structure in the lower part.

B_2 17 to 34 inches, reddish-brown (5YR 5/4, dry; 5YR 4/4, moist), very friable, noncalcareous, permeable fine sandy loam; weak prismatic and weak granular structure.

B_3 34 to 55 inches, yellowish-red (5YR 5/6, dry; 5YR 4/6, moist), very friable, noncalcareous, massive fine sandy loam.

C_{ca} 55 to 70 inches +, white chalky zone of lime accumulation similar to C_{ca} horizon in the Amarillo soils.

Use and management.—This soil is too sandy for cultivation and is in native pasture. It is in management group 8 and in the Deep Sand site for range management. Several areas of this soil were once cultivated, but after several seasons the soil became so

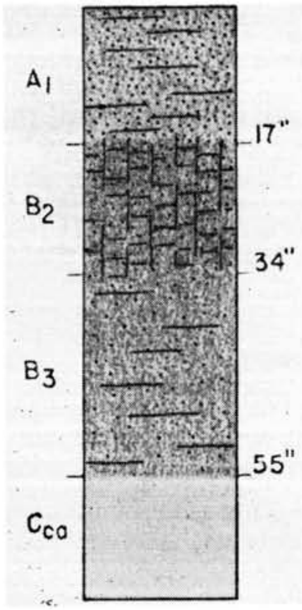

FIGURE 12.—Profile of Springer loamy fine sand, 0 to 2 percent slopes.

severely damaged by wind erosion that further cultivation was not possible.

Springer loamy fine sand, 2 to 5 percent slopes (Sb).—Except that it occupies stronger slopes, this soil is like the associated Springer loamy fine sand, 0 to 2 percent slopes. Most of it occurs on small hills and ridges.

Use and management.—This soil is used in the same way as Springer loamy fine sand, 0 to 2 percent slopes. It is in management group 8 and in the Deep Sand site for range management.

Spur Soils

The Spur soils occur throughout the county, mainly at the bottoms of draws. In some of the larger draws, they are on low terraces above drainage channels. They have developed from medium textured and moderately fine textured alluvial materials washed from higher lying, adjacent Amarillo, Pullman, and Mansker soils. The Spur soils have weakly developed profiles.

Range in characteristics.—The typical Spur soils are noncalcareous in the upper part, but a few areas of Spur loam are calcareous to the surface. Some areas of Spur clay loam are noncalcareous to a depth of 16 inches. The color of the surface soil ranges from brown (10YR 5/3 or 7.5YR 5/3, dry) to dark grayish brown (10YR 4/2, dry), and that of the subsoil from yellowish brown or brown (10YR 5/4 or 7.5YR 5/4, dry) to dark grayish brown (10YR 4/2, dry). The texture of the subsoil ranges from sandy clay loam to clay loam. In some places the profile shows practically no development, but in others it is weakly developed. The profile of Spur loam is not so well developed as that of Spur clay loam. Spur clay loam is generally darker in color, finer in texture, and deeper to calcareous material than Spur loam.

Spur clay loam (Se).—This soil generally occurs in long, narrow strips that are parallel to drainage channels. A typical profile is illustrated in figure 13.

Description of a representative profile, located in the NW¼SW¼ sec. 25, T. 5 N., R. 33 E:

A_1 0 to 3 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist), friable, noncalcareous, moderately permeable to slowly permeable clay loam; moderate granular structure.

B_1 3 to 16 inches, dark grayish-brown to very dark grayish-brown (10YR 3.5/2), firm, noncalcareous, slowly permeable clay loam; weak prismatic structure that breaks to weak blocky structure.

BC 16 to 28 inches, brown to dark-brown (10YR 4/3, dry; 10YR 3/3, moist), friable, calcareous, moderately permeable loam; weak granular structure.

C 28 to 40 inches, brown (10YR 5/3, dry; 10YR 4/3, moist), massive, friable, calcareous, moderately permeable loam.

D 40 inches +, stratified loam and fine sandy loam materials that are massive and strongly calcareous.

Use and management.—Because this soil occurs in small, narrow strips, it is not cultivated. It is in native pasture and is used for grazing. This soil is in management group 9 and in the Heavy Bottom-land site for range management.

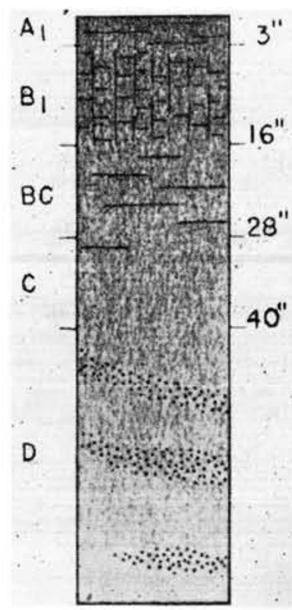

FIGURE 13.—Profile of Spur clay loam.

Spur loam (Sg).—This soil is similar to Spur clay loam, except that it is slightly sandier throughout and has a loam surface layer.

Description of a representative profile, located in the NW¼NW¼ sec. 21, T. 4 N., R. 31 E:

A_1 0 to 4 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist), friable, noncalcareous, moderately permeable loam; weak granular structure.

B_1 4 to 13 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist), friable, noncalcareous, moderately permeable sandy clay loam; weak blocky structure.

BC 13 to 28 inches, dark grayish-brown (10YR 4/2, dry; 10YR 3/2, moist), friable, calcareous, moderately permeable loam; weak granular structure.

C 28 inches +, brown (10YR 5/3, dry), massive, friable, strongly calcareous loam that is underlain in many places by stratified loam and fine sandy loam materials.

Use and management.—This soil is used in the same way as Spur clay loam. It is in management group 5 and in the Plains Upland site for range management.

Stony Rough Land

These land types—Stony rough land, mixed materials, and Stony rough land, Potter materials—are normally loam in texture and contain many pebbles and boulders.

Stony rough land, mixed materials (Sc).—This land type occurs along the northern edge of the county. It consists of an escarpment formed by outcrops of limestone, sandstone, and shale, and a rough mixture of colluvial materials on the slopes below the escarpment. The stony, gravelly soil materials are medium textured to coarse textured. The areas are steep and hilly and are dissected by many drainage channels.

Use and management.—All areas are used for native pasture. Yields of forage are fair to high, but in places grazing is difficult because of the rough terrain. This land type is in management group 11 and in the Breaks site for range management.

Stony rough land, Potter materials (Sd).—This land type occupies steep stony escarpments along several of the larger draws. It occurs most commonly along Tierra Blanca Creek in the northeastern part of the county, along Alamosa Creek in the western part, and along several drainageways that empty into Blanco Creek (also called Frio Draw) in the central part of the county. Many areas are capped with rocklike caliche and include steep rocky slopes of colluvial materials. Other areas occur on the steep slopes of draws and include exposures of rocklike caliche. Boulders and fragments of caliche are common. The soil material is shallow gravelly loam, which resembles that of the Potter soils.

Use and management.—All of this land is used for native pasture. Yields of forage are fairly high, but grazing is difficult because of the steep, rough terrain. This land type is in management group 11 and in the Breaks site for range management.

Tivoli Soils

The Tivoli soils, represented in Curry County by Tivoli fine sand, are deep, loose, and sandy. Most of the areas occur in the sandhills in the southwestern part of the county, but some are along the bottom of Blanco Creek (Frio Draw) in the east-central part of the county. Tivoli fine sand developed on large dunes and ridges from sands deposited by wind. The dunes are undulating and the ridges are hilly or steep. Most of the soil is stabilized and protected from wind erosion by vegetation. A few of the steeper ridges are bare and are actively eroding.

Range in characteristics.—These soils are fairly uniform in characteristics.

Tivoli fine sand (Ta).—The profile of this soil is virtually undeveloped. To a depth of about 8 inches the soil is strong-brown to reddish-yellow, noncalcareous, loose, fine sand. This is underlain by reddish-yellow fine sand. Below a depth of about 3 feet, the soil is weakly compacted in place but easily breaks to loose fine sand when disturbed. This soil generally is many feet deep.

Use and management.—All of this soil is in native grasses and is used for pasture. It is in management group 10 and in the Deep Sand site for range management.

Tivoli-Arch-Potter Complex

Tivoli-Arch-Potter complex (Tb).—This soil complex occurs in the southwestern part of the county. It consists of sand dunes of Tivoli soil material and of intervening small flats occupied by Arch and Potter soils. The soil pattern within this complex is so variable and intermixed that it is not practical to map these soils separately.

In places the Potter materials contain exposures of fractured, indurated caliche. In other places the surface layer consists of several inches of loamy fine sand or fine sand. The texture of the Arch materials varies from loam, where the strongly calcareous substratum material is exposed, to loamy fine sand, in areas where some of the surface soil remains. In several places the dunes consist of materials that are calcareous throughout and resemble Drake loamy fine sand, 2 to 10 percent slopes. The Tivoli, Arch, and Potter soils are elsewhere described individually under their own series names.

Use and management.—This complex is used for native pasture. It is in management group 10 and in the Deep Sand site for range management.

Management

This section has four main parts. The first explains the system of land capability grouping used by the Soil Conservation Service and indicates how use and management can be planned in terms of capability classes and management groups. The second discusses the productivity of the soils and provides a table giving estimated average acre yields on irrigated soils under two levels of management. The third discusses general principles of management basic to good farming anywhere in the county. The fourth discusses irrigation.

Capability Classification of Soils

The capability classification is a means of showing the relative suitability of different soils for use. The classification of a particular soil depends on the variety of uses to which it is suited, its susceptibility to erosion or other damage if it is cultivated, and the kind and degree of management it needs to protect it from erosion and maintain its productivity.

Eight general capability classes are recognized. In classes I, II, and III are soils that are suitable for an-

nual or periodic cultivation. Class I soils are those that have the widest range of use. They are level, productive, well drained, and easy to work. They do not erode readily, even when cultivated year after year, and they will remain productive if managed with normal care. Class II soils do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping or moderately sandy and consequently need moderate care to prevent erosion; others are slightly droughty, or somewhat limited in depth. Class III soils can be cropped regularly but have a narrower range of use and need still more careful management. Soils in these three classes are suitable for range.

In class IV are soils that should be cultivated only occasionally or only under very careful management. They are suitable for range.

In classes V, VI, and VII are soils that should not be cultivated but that can be used for pasture, for range, or for forest. Class V soils are level but are droughty, wet, or low in fertility, or otherwise unsuitable for cultivation. Class VI soils are not suitable for crops because they are steep or droughty or otherwise limited, but they give fair yields of forage or forest products. Some soils in class VI can, without damage, be cultivated enough so that trees can be set out or pasture plants seeded. Class VII soils provide only poor to fair yields of forage or forest products.

In class VIII are soils that have practically no agricultural use. These areas produce little useful vegetation, but they may provide attractive scenery; they may form parts of watersheds; or they may provide shelter for wildlife. Some can be used for recreation. Barren mountains, rock outcrops, and sand dunes are examples of class VIII land.

CAPABILITY CLASSES IN CURRY COUNTY.—In Curry County precipitation is limited and the soils are subject to wind erosion. Under these conditions there are no class I or class II soils. The best arable soils are those in class III, but they require management that will conserve moisture and control wind erosion. Under irrigation, however, with the use of sufficient water, the best soils may be considered as class II soils.

The class IV soils in Curry County are likely to be damaged by wind erosion. On these soils only crops that leave enough residue to protect them against high winds can be grown continuously. During periods when the precipitation is below average, it may be necessary to plant sorghum or other crops primarily to control wind erosion, with no expectance of profitable returns. Areas in pasture should not be cultivated. The soils in this class are very productive rangeland, but farming is hazardous.

Soils in class VI are poorly suited to cultivation but may be used for continuous grazing if moderate restrictions are practiced.

Class VII soils are suited to grazing only if they are carefully stocked and if grazing is halted periodically. The land deteriorates rapidly if overgrazed.

Soil management groups

Each capability class contains one or more management groups of soils, each group consisting of soils that need about the same kind of treatment to offset their limitations. There are 11 management groups in all. Groups 1 through 4 are made up of soils that are suited to either cultivation or grazing; they are in capability classes III and IV. Groups 5 through 11 consist of soils of capability classes VI and VII; these soils are suitable only for grazing.

Management of the arable soils of the county, under both dryland farming and irrigation farming, is discussed in the following pages. The management of all the soils of the county, when used for grazing, is discussed in the section, Management of Rangeland.

The capability class and management group for each soil in Curry County are shown in the following list.

- Capability class III
  - Management group 1
    - Amarillo loam, 0 to 2 percent slopes.
    - Amarillo loam, 2 to 5 percent slopes.
    - Clovis loam, 0 to 2 percent slopes.
    - Clovis loam, 2 to 5 percent slopes.
    - Pullman loam, 0 to 2 percent slopes.
    - Pullman loam, 2 to 5 percent slopes.
    - Pullman loam, thin solum, 0 to 2 percent slopes.
    - Pullman loam, thin solum, 2 to 5 percent slopes.
  - Management group 2
    - Amarillo fine sandy loam, 0 to 2 percent slopes.
    - Amarillo fine sandy loam, 2 to 5 percent slopes.
    - Clovis fine sandy loam, 0 to 2 percent slopes.
    - Clovis fine sandy loam, 2 to 5 percent slopes.
- Capability class IV
  - Management group 3
    - Amarillo loamy fine sand, 0 to 2 percent slopes.
    - Amarillo loamy fine sand, 2 to 5 percent slopes.
    - Clovis loamy fine sand, 0 to 2 percent slopes.
    - Clovis loamy fine sand, 2 to 5 percent slopes.
  - Management group 4
    - Mansker loam, 0 to 2 percent slopes.
    - Mansker fine sandy loam, 0 to 2 percent slopes.
- Capability class VI
  - Management group 5
    - Alluvial land.
    - Mansker loam, 2 to 5 percent slopes.
    - Mansker loam, 5 to 10 percent slopes.
    - Spur loam.
  - Management group 6
    - Potter fine sandy loam, 0 to 5 percent slopes.
    - Potter fine sandy loam, 5 to 20 percent slopes.
    - Potter loam, 0 to 5 percent slopes.
    - Potter loam, 5 to 20 percent slopes.
  - Management group 7
    - Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded.
    - Arch fine sandy loam.
    - Arch loamy fine sand.
    - Clovis loamy fine sand, 0 to 2 percent slopes, wind eroded.
    - Mansker fine sandy loam, 2 to 5 percent slopes.
    - Mansker fine sandy loam, 5 to 10 percent slopes.
    - Mansker loamy fine sand, 0 to 2 percent slopes.
  - Management group 8
    - Brownfield fine sand, 0 to 2 percent slopes.
    - Drake fine sandy loam, 2 to 10 percent slopes.
    - Springer loamy fine sand, 0 to 2 percent slopes.
    - Springer loamy fine sand, 2 to 5 percent slopes.
  - Management group 9
    - Church clay loam.
    - Lofton clay loam.
    - Spur clay loam.
- Capability class VII
  - Management group 10
    - Brownfield fine sand, 0 to 2 percent slopes, wind eroded.
    - Drake loamy fine sand, 2 to 10 percent slopes.
    - Tivoli fine sand.
    - Tivoli-Arch-Potter complex.
  - Management group 11
    - Stony rough land, mixed materials.
    - Stony rough land, Potter materials.

MANAGEMENT GROUP 1

All of the soils of group 1 are in capability class III. These soils are deep to moderately deep and have compact, moderately fine textured subsoils. They are the cultivated "hardlands" of Association I (Pullman-Amarillo-Clovis loams). The following soils are in this management group:

Amarillo loam, 0 to 2 percent slopes.
Amarillo loam, 2 to 5 percent slopes.
Clovis loam, 0 to 2 percent slopes.
Clovis loam, 2 to 5 percent slopes.
Pullman loam, 0 to 2 percent slopes.
Pullman loam, 2 to 5 percent slopes.
Pullman loam, thin solum, 0 to 2 percent slopes.
Pullman loam, thin solum, 2 to 5 percent slopes.

Dryland farming.—The soils of group 1 are used mainly for dryland farming. Winter wheat is the principal crop, but the soils are also suited to rye, barley, and grain sorghum.

The principal management problem is to conserve moisture. Contour tillage, stubble-mulch tillage, and terracing of long slopes help to retain the moisture. The soil should be moist to a depth of at least 24 inches when small grains are planted, or the crop is likely to fail. Soils that are too dry should be fallowed. During fallow, old crop residues should be left on the soil and weeds should be controlled by stubble-mulch tillage. If a tillage pan develops, it should be broken by deep chiseling.

The soils of group 1 are not so likely to be severely damaged by wind erosion as sandier soils. Nevertheless, crop residues or a growing crop must be maintained to protect them during the windy season. If the crop does not produce a good stand, the surface of the soil should be roughened by deep chiseling or by listing across the direction of prevailing winds. The crop should be planted as soon as there is enough moisture.

Irrigation farming.—In group 1 are the most productive irrigated soils in Curry County. Winter wheat and grain sorghum are the principal irrigated crops. Corn, pintobeans, sudangrass, cotton, and sesame are also grown under irrigation. Alfalfa or other legumes that require large amounts of water probably cannot be grown economically as a cash crop on these soils, but they help build up the soil if used in the rotation as green-manure crops or as irrigated pasture.

These soils do not absorb irrigation water readily, because their subsoils, particularly those of the Pullman soils, are slowly permeable to moisture. If water is to be distributed evenly, either the areas must be made nearly level or irrigation runs must follow the contour and small heads of water must be used.

These soils will be damaged by wind if they are not protected. A vegetative cover should be maintained during the windy season.

These soils respond to applications of commercial fertilizers containing nitrogen and phosphorus and to barnyard manure.

MANAGEMENT GROUP 2

All the soils of group 2 are in capability class III. These soils are moderately deep to deep. They are moderately sandy soils with medium-textured loamy subsoils. They are the cultivated soils of Association II (Amarillo-Clovis fine sandy loams). The following soils are in this management group:

Amarillo fine sandy loam, 0 to 2 percent slopes.
Amarillo fine sandy loam, 2 to 5 percent slopes.
Clovis fine sandy loam, 0 to 2 percent slopes.
Clovis fine sandy loam, 2 to 5 percent slopes.

Dryland farming.—The soils of group 2 are used mainly for dryland farming. Grain sorghum is the principal crop, but winter wheat and sudangrass are also grown. These soils are better able to supply moisture to plants than the finer textured soils of group 1. They are, in general, the most productive soils in the county under dryland farming.

A cover crop should be grown or the crop stubble should be left on the soils throughout the windy season to prevent damage through wind erosion. If the crop does not produce an adequate cover, emergency tilling is necessary, such as listing or deep plowing across the direction of the prevailing winds. This roughens the surface so that the soil resists erosion. If a tillage pan develops it should be broken by deep chiseling.

Winter wheat should not be planted unless the soil is moist to a depth of more than 24 inches. When fallow, the soil should be protected by crop residues. Stubble-mulch tillage helps to keep moisture in the soil.

Irrigation farming.—Grain sorghum is the principal irrigated crop on these soils. The soils respond well to irrigation, but not so well as the soils of group 1. They absorb water rapidly, but their moisture-holding capacity is lower than that of the finer textured soils. The irrigation runs therefore should be shorter, and water should be applied in smaller amounts and more frequently.

Much of the irrigation water is absorbed in the irrigation ditch. This loss of water can be prevented by lining the ditches or by installing underground pipes to carry the water. For proper irrigation, these soils should be leveled to a uniform grade.

A vegetative cover should be maintained throughout the windy season for protection against wind erosion. The stubble should not be grazed and should remain on the soil.

These soils respond to applications of barnyard manure and of commercial fertilizers that contain nitrogen and phosphorus.

MANAGEMENT GROUP 3

All the soils of group 3 are in capability class IV. Locally these soils are called "sandy row-crop land." They have sandy surface soils and loamy medium-textured subsoils. They are the cultivated soils of Association III (Amarillo-Clovis loamy fine sands). The following soils are in this management group:

Amarillo loamy fine sand, 0 to 2 percent slopes.
Amarillo loamy fine sand, 2 to 5 percent slopes.
Clovis loamy fine sand, 0 to 2 percent slopes.
Clovis loamy fine sand, 2 to 5 percent slopes.

Dryland farming.—If cultivated, the soils of group 3 are highly erodible. They are very productive under dryland farming in years when there is enough rainfall. But during the droughts that occur periodically crops are so poor that they do not provide enough cover to protect the soils from wind erosion. If the soils are not protected, erosion may damage them severely.

The tilled crops for which these soils are best suited are grain sorghum, sudangrass, and broomcorn. If the soils are cultivated, a stubble 12 to 14 inches high should be maintained throughout the windy season. The stubble should not be grazed.

These soils are probably best suited to permanent pasture. If they have been cultivated, it may be necessary to bring part of the loamy subsoil to the surface by deep plowing before a stand of grass can be obtained. A temporary row crop will help grass to become established by protecting the young plants.

Deep listing and other emergency tillage practices help to prevent erosion on soils that are not protected by vegetation. For emergency tillage to be effective, however, the subsoil, when brought to the surface, must contain enough clay to form wind-resistant clods. Emergency tillage has only a temporary effect and is not an effective substitute for maintaining a vegetative cover.

Irrigation farming.—These soils are rather poorly suited to irrigation. They produce lower yields of irrigated crops than soils of management groups 1 and 2. They absorb water rapidly, so irrigation runs must be short. Lining the irrigation ditches or installing underground pipes will prevent loss of water. Only small fields in which the irrigation water can be managed properly should be irrigated.

MANAGEMENT GROUP 4

All the soils of group 4 are in capability class IV. These soils are shallow and strongly calcareous. They generally occupy small nearly level areas within broader areas of deep noncalcareous soils. They are the cultivated soils of Association V (Mansker-Potter association). The following soils are in this management group:

Mansker fine sandy loam, 0 to 2 percent slopes.
Mansker loam, 0 to 2 percent slopes.

Dryland farming.—Many small areas of these soils occur in close association with the deeper soils of management groups 1 and 2 and are used in the same way. Winter wheat and grain sorghum are the principal crops. Under dryland farming the yields of winter wheat are as high as on deeper noncalcareous associated soils, but yields of row crops are lower.

These soils are strongly calcareous to the surface. They are highly erodible and need a protective cover of vegetation during the windy season.

Irrigation farming.—The soils of group 4 respond poorly to irrigation. They produce much lower yields than the associated soils. They require applications of barnyard manure if irrigated and used for crops.

MANAGEMENT GROUP 5

All the soils of group 5 are in capability class VI. Some of them are medium textured and occur on the bottom lands of the larger draws. The more calcareous ones occur on the side slopes of draws and playas. The group consists of the following mapping units:

Alluvial land.
Mansker loam, 2 to 5 percent slopes.
Mansker loam, 5 to 10 percent slopes.
Spur loam.

Because of slope or unfavorable position, these soils are poorly suited to cultivation. Most of them are used for permanent pasture, which if properly managed affords good grazing. Range management for these soils is discussed under the Plains Upland site, in the section, Management of Rangeland.

MANAGEMENT GROUP 6

The soils of this management group are in capability class VI. They are shallow and strongly calcareous and are underlain by hard caliche. They normally occupy the upper margins of the slopes of draws and playas. These soils also occur in small patches within broader areas of nearly level soils. Many small areas occur throughout the county, but their total acreage constitutes only about 1 percent of the land area. The following soils are in management group 6:

Potter fine sandy loam, 0 to 5 percent slopes.
Potter fine sandy loam, 5 to 20 percent slopes.
Potter loam, 0 to 5 percent slopes.
Potter loam, 5 to 20 percent slopes.

Except for a few small spots that occur within and are cultivated with larger areas of deeper soils, these soils are used for permanent pasture. Range management is discussed under the Shallow Upland site in the section, Management of Rangeland.

MANAGEMENT GROUP 7

All the soils of group 7 are in capability class VI. These sandy and moderately sandy soils are unsuited or poorly suited to cultivation. The following soils are in group 7:

Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded.
Arch fine sandy loam.
Arch loamy fine sand.
Clovis loamy fine sand, 0 to 2 percent slopes, wind eroded.
Mansker fine sandy loam, 2 to 5 percent slopes.
Mansker fine sandy loam, 5 to 10 percent slopes.
Mansker loamy fine sand, 0 to 2 percent slopes.

Normally, these soils do not produce profitable yields of dryland crops, even if the climate is favorable. Their response to irrigation is too poor to justify irrigating from deep wells. In the southwestern part of the county, however, where water occurs at a depth of about 60 feet, several areas of Arch fine sandy loam are cultivated under irrigation. These irrigated areas are best suited to hay or pasture and are not well suited to row crops.

The soils of group 7 are best suited to hay or permanent pasture. Areas previously cultivated should be reseeded to grass. A temporary cover crop of sudangrass, grain sorghum, or broomcorn may be needed to protect the young pasture plants. Good stands of grass can be obtained only during favorable seasons.

Range management for these soils is discussed under the Sandy Plains site, in the section, Management of Rangeland.

MANAGEMENT GROUP 8

All the soils of group 8 are in capability class VI. These deep, sandy soils are unsuited to cultivation. Group 8 consists of the following soils:

Brownfield fine sand, 0 to 2 percent slopes.
Drake fine sandy loam, 2 to 10 percent slopes.

Springer loamy fine sand, 0 to 2 percent slopes.
Springer loamy fine sand, 2 to 5 percent slopes.

Under good management the soils of this group produce high forage yields. They should be used only for permanent pasture. Several areas of Springer loamy fine sand were once cultivated. But after several years these areas became so severely damaged by wind erosion that they are now unsuited to agriculture. Range management for these soils is discussed under the Deep Sand site, in the section, Management of Rangeland.

MANAGEMENT GROUP 9

All the soils of group 9 are in capability class VI. They are moderately fine textured. They occur throughout the county on low benches on the bottoms of draws and in playas. The following soils are in group 9:

Church clay loam.
Lofton clay loam.
Spur clay loam.

Most of the acreage is used for permanent pasture. These soils are poorly suited to cultivation because of their topographic position, the small size of the areas, and their moderately fine texture. Range management is discussed under the Heavy Bottom-land site, in the section, Management of Rangeland.

MANAGEMENT GROUP 10

All the soils of group 10 are in capability class VII. They are the sandy, more dunelike soils of Association VI (Tivoli-Springer-Brownfield). The soils are similar to those of management group 8, except that they are more droughty, are more likely to be damaged by wind erosion, and require more restriction of grazing to protect the desirable forage grasses. The group consists of the following:

Brownfield fine sand, 0 to 2 percent slopes, wind eroded.
Drake loamy fine sand, 2 to 10 percent slopes.
Tivoli fine sand.
Tivoli-Arch-Potter complex.

Range management for these soils is discussed under the Deep Sand site, in the section, Management of Rangeland.

MANAGEMENT GROUP 11

This group consists of two shallow, rough, stony land types that are in capability class VII. They occur on slopes below the caprock in the southwestern part of the county and on very steep, stony slopes along several of the larger draws. The following mapping units are in management group 11:

Stony rough land, mixed materials.
Stony rough land, Potter materials.

These land types are suited to limited grazing. Areas on slopes below the caprock are also used to some extent for recreation and for wildlife habitats. Range management for these land types is discussed under the Breaks site, in the section, Management of Rangeland.

Soil productivity

In this section yields of crops in Curry County are discussed under the headings, Yields Under Dryland Farming and Yields Under Irrigation Farming.

YIELDS UNDER DRYLAND FARMING

Under dryland farming, which is the prevailing type of agriculture in the county, a limited amount of moisture is available to crops. Yields are high only if the yearly rainfall is above normal. The moderately sandy soils produce higher crop yields than the finer textured soils during dry years, but the finer textured soils produce higher yields if precipitation is above normal.

Yields depend largely on the amount of moisture in the soil at planting time and the amount of precipitation that falls during the growing season. High temperatures and hot drying winds, however, may reduce yields by depleting the supply of moisture and by damaging young plants. Yields of row crops are limited if windstorms late in spring delay planting or necessitate replanting or if early fall frosts prevent crops from maturing.

Crops of winter wheat are apt to fail in the high plains if there is less than 2 feet of subsoil moisture at seeding time (*3*). Lack of effective precipitation during the October-April period may cause failure of the wheat crop in some years, even if there is plenty of moisture in the subsoil. The climatic data, based on records for 45 years at Clovis, show that 38 percent of the October-April periods had less than 2.51 inches of effective precipitation. Growing winter wheat in the Clovis area would therefore appear to be risky about 30 to 40 percent of the time, because of inadequate moisture in winter and early spring. Records at Melrose, in the western part of Curry County, indicate that the moisture supply is inadequate 10 percent oftener than at Clovis. Yields of wheat on the Amarillo and Pullman soils average 10 to 15 bushels per acre in years when the rainfall is average or above average. Failures or near failures occur in years when rainfall is below average.

The effective rainfall during the March-September period is critical for yields of grain sorghum. In 38 percent of the years for which records are available there was less than 7.01 inches of effective precipitation at Clovis. In such years yields are low and crop failures common. In these dry years the sandy soils produce higher yields than the loams. The reverse is true in the wetter years. Yields of sorghum on the Amarillo and Pullman soils average 1,000 to 1,300 pounds per acre in years when March-September rainfall is normal or above; in years of unusually high rainfall, yields may be doubled.

Over a 6-year period, from 1946 through 1951, the yields of grain sorghum ranged from 500 to 1,375 pounds per acre. Over a 7-year period, from 1945 through 1951, yields of wheat ranged from 9.6 to 15.3 bushels per acre. The average acre yields, including crop failures, were 887 pounds of grain sorghum and 9.5 bushels of wheat. Yields of wheat and grain sorghum under dryland farming are much lower than under irrigation farming.

TABLE 2.—*Estimated average acre yields of crops on irrigated soils under two levels of management*

[Yields in columns A are those obtained under ordinary management; yields in columns B are obtained under improved management. Absence of a yield figure indicates the crop is not commonly grown on the soil]

Soil	Wheat		Grain sorghum		Corn		Pintobeans		Alfalfa	
	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lb.*	*Lb.*	*Bu.*	*Bu.*	*Lb.*	*Lb.*	*Tons*	*Tons*
Amarillo loam, 0 to 2 percent slopes	28	50	3,500	7,500	80	150	1,500	3,000	5	8
Amarillo fine sandy loam, 0 to 2 percent slopes	22	45	2,500	7,000	60	120	1,500	3,000	5	8
Amarillo loamy fine sand, 0 to 2 percent slopes			1,500	6,000	40	120			4	7
Arch fine sandy loam									4	7
Clovis loam, 0 to 2 percent slopes	28	50	3,500	7,000	80	150	1,500	3,000	5	8
Clovis fine sandy loam, 0 to 2 percent slopes	22	45	2,500	6,500	60	120	1,500	3,000	5	8
Clovis loamy fine sand, 0 to 2 percent slopes			1,500	5,500	40	120			4	7
Mansker loam, 0 to 2 percent slopes	20	40	1,800	5,000					5	8
Mansker fine sandy loam, 0 to 2 percent slopes	20	40	1,800	4,000					5	8
Pullman loam, 0 to 2 percent slopes	30	55	3,600	7,500	90	150	1,500	3,000	5	8
Pullman loam, thin solum, 0 to 2 percent slopes	30	55	3,600	7,500	90	150	1,500	3,000	5	8

YIELDS UNDER IRRIGATION FARMING

In Curry County irrigation is used mainly to supplement the moisture supply from precipitation. The soils have been irrigated only in recent years. Consequently, there are little data that can be used to predict yields of irrigated crops. The estimated average acre yields for crops on irrigated soils are given under two levels of management in table 2. Columns A give the yields commonly obtained under ordinary irrigation practices if little or no fertilizer or manure is used. Columns B give the potential yields that can be expected under excellent soil management, including ample and careful irrigation and the application of sufficient quantities of manure and fertilizers.

General management in Curry County

Dryland farming is the prevailing type of agriculture in Curry County. Farming methods are relatively simple, but because of the semiarid climate and the nature of the soils, certain basic management practices are required. The use of pump irrigation has brought about changes in the management needed on many farms. The general management requirements are discussed in the following pages. Farmers can get help in applying any of these practices from the local representative of the Soil Conservation Service, the county agricultural agent, or a member of the staff of the State experiment station.

CONSERVING MOISTURE

Conserving moisture is a major management requirement in dryland farming.

The soils of management group 1 and the Mansker loam of management group 4 absorb moisture rather slowly. Even on the slopes of less than 1 percent, considerable moisture may be lost during heavy rains unless measures are taken to prevent runoff. Intensive conservation practices must be used to conserve moisture and control erosion on the steeper slopes.

The sandier soils absorb moisture more rapidly than the finer textured ones; nevertheless, considerable moisture will be lost on sloping areas of sandy soils unless measures are taken to conserve it.

Several practices help to hold moisture and reduce erosion. A vegetative cover of crops or crop residues or of well-managed pasture should be kept on the soil. This helps the soil absorb moisture, because it slows runoff and reduces the sealing caused by the impact of raindrops. Contour tillage is one of the best methods of preventing rainwater from running off. Breaking long slopes with contour furrows, terraces, diversion dams, or water spreaders helps to distribute water more uniformly and reduces runoff and erosion. (fig. 14). Assistance in designing moisture-conserving

FIGURE 14.—Contour furrows filled with water after a heavy rain. Furrows were made by a lister.

structures may be obtained from the county agent or the local representatives of the Soil Conservation Service. Breaking tillage pans and using stubble-mulch tillage also help conserve moisture.

Weeds compete with crops for moisture and plant nutrients. Under dryland farming a heavy growth of weeds can appreciably reduce a crop yield by depleting the soil moisture. Subsurface tillage implements, such

as rod weeders or sweeps, can be used to destroy the weeds. If surface tillage is practiced, considerable moisture will be lost through evaporation. Chemicals are fairly successful in controlling perennial weeds that are difficult to eradicate.

CONTROLLING WIND EROSION

Wind erosion presents one of the most serious management problems in Curry County. No farm is immune to the damage caused by high winds. Effective control of erosion requires the cooperation of all the farmers in an area, because soil material blown from unprotected fields will damage the soils on adjoining farms. Wind erosion is most likely to occur in winter and spring. Unprotected soils may become unsuitable for cultivation after a single season of windstorms.

Maintaining a vegetative cover of winter wheat or leaving crop residues on the soil during the windy season are the most effective ways of controlling erosion (fig. 15). If the wheat is grazed during the winter, the number of animals should be limited to prevent overgrazing and trampling. Sorghum stubble, which contains considerable leaf matter and is left 12 to 14 inches high, effectively restricts erosion, even on highly erodible soils. Well-managed grassland also resists erosion.

Keeping the surface soil cloddy reduces losses through wind erosion in places that lack a good vegetative cover. Soil aggregates larger than 0.84 mm. (0.033 inch) in diameter generally erode only if the winds are of unusually high velocity. In Curry County damage by wind erosion has been least severe in areas where more than 60 percent of the topmost inch of surface soil consisted of particles more than 0.84 mm. in diameter, or where more than 70 percent of the top inch consisted of particles that were more than 0.42 mm. in diameter (*9*).

In places where there is not enough vegetation to protect the soil, deep listing or deep chiseling should be used to make the surface soil cloddy (fig. 16). Deep listing is commonly used on the coarse-textured soils, and the rows are run crosswise to the direction of the prevailing winds. This practice is highly effective if enough clods to resist wind action are brought to the surface. Deep chiseling helps control erosion of finer textured soils. The chisel bottoms must be placed fairly close together to roughen the surface soil adequately.

The amount of clay in the surface soil determines how well the soil will clod and how stable the clods will be. To be nonerodible the clods must be able to withstand the abrasive force of drifting soil particles. Sandy soils that contain little clay in the surface layer are highly erodible if not protected by a vegetative cover. The fine-textured soils are much more resistant to erosion.

Deep plowing is used on sandy soils to bring up clods that contain a high proportion of clay. If the clayey particles are blown away, however, only a deep mantle of sand, extending to the depth the soil was plowed, will remain. A soil in this condition has been permanently damaged and will no longer be suitable for cultivation.

Strongly calcareous soils are much more susceptible to wind erosion than are noncalcareous soils of similar texture. Most of the free calcium carbonate in the soil occurs in silt-sized particles. It is only a weak cementing agent; consequently the clods that form are fragile and are easily broken by drifting sands.

Preserving the structure of the surface soil helps control erosion. The structure is improved by keeping the content of organic matter high. The structure of the surface soil may be damaged and clods broken up by the impact of raindrops when the soil is not covered by vegetation.

Stubble-mulch tillage.—Stubble-mulch tillage is a method of cultivating with a sweep, in such a way that the stubble is not much disturbed. This method of tillage is becoming more common in Curry County, but

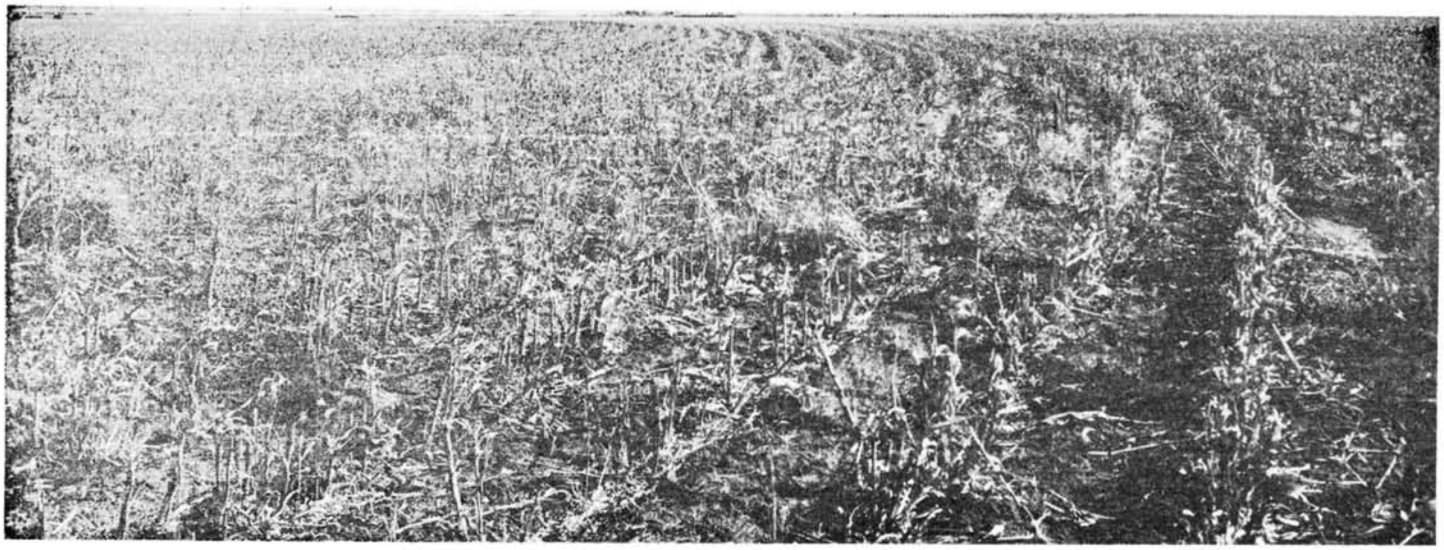

FIGURE 15.—Grain sorghum residue on Amarillo loam.

FIGURE 16.—Cultivated area of Amarillo loamy fine sand poorly protected against wind erosion and subject to severe blowing.

one-way diskplows are still used more commonly to till the wheatlands. One-way tillage is easier and quicker than stubble-mulch tillage, but it is likely to result in the formation of a tillage pan, and to increase the risk of erosion if the soil is plowed soon after the wheat is harvested.

In the High Plains area, average yields of wheat on the Pullman soils were consistently higher where stubble-mulch tillage had been practiced than where diskplows had been used. Stubble-mulch tillage allows more of the crop residue to remain on the soil. This additional organic matter helps to improve the structure of the soil and to increase its capacity to store moisture while fallow. Stubble-mulch tillage also helps to prevent the surface soil from being sealed by the impact of raindrops or by melting snow. The soil thus remains more permeable and loses less moisture through evaporation.

The principal disadvantages of stubble-mulch tillage are that deep-furrow seed drills must be used for planting, and proper attachments are needed to prevent the stubble from obstructing planting operations.

Delayed fallow.—Delayed fallow is the practice of leaving the stubble on fallow soil undisturbed until spring and tilling only when weeds begin to deplete the moisture supply. This method of managing fallow soil is most effective if combined with stubble-mulch tillage, which destroys the weeds without disturbing the protective cover of stubble.

Delayed fallow is practiced throughout the wheatlands of the High Plains. It has little effect on crop yields but it is more economical than early tilling of fallow land because it requires fewer cultivations; it affords better protection from wind erosion; and it helps prevent the formation of a tillage pan because cultivation can be avoided at times when the soil is easily compacted.

ELIMINATING TILLAGE PANS

A dense compact layer, known as a tillage pan or plowsole, is common in the cultivated soils of Curry County. The tillage pan occurs just below the normal plow layer. It results from the compaction of moist soil by tillage implements or other farm machinery. In areas of dryland farming, farmers commonly prepare the seedbeds and plant crops shortly after a rain, when there is enough moisture in the soil so seeds will germinate. This practice is likely to cause a tillage pan to form.

The compact tillage pan restricts the movement of water and air through the soil and limits root development. Plant roots are likely to turn laterally on reaching the tillage pan, and to form a mat along its upper surface.

To prevent tillage pans from forming, the soil should not be worked with machinery if there is enough moisture to a depth of 6 to 8 inches so that a ball can be formed by squeezing the soil in the hand. Tillage pans can be destroyed by deep plowing, or by deep chiseling if the pan is dry enough to shatter.

FERTILIZING THE SOILS

The use of fertilizers in Curry County is confined almost entirely to irrigated soils. It is doubtful whether it would be profitable to fertilize nonirrigated soils except in years when rainfall is above normal. Properly irrigated soils respond to commercial fertilizers that contain nitrogen and phosphorus and to barnyard manure.

Irrigation

Because of the prolonged droughts in the past few years, irrigation has become important in Curry County. Before 1940 only a small acreage in the county was irrigated, but by 1952 about 3,500 acres was under

irrigation. By 1953 enough water to irrigate approximately 20,000 acres was being pumped from 88 irrigation wells. Water from an estimated 400 wells was used to irrigate about 80,000 acres by the summer of 1955.

Wells in Curry County.—Most of the irrigation wells are in the southeastern quarter of Curry County (fig. 17). In most places in the county, irrigation water has to be pumped from a depth of about 250 feet. The depth to water ranges, however, from about 60 feet, in Blackwater Draw in the southwestern part of the county, to nearly 400 feet, at a site about 12 miles north of Clovis (fig. 18). Considerable expense is involved in pumping water from so great a depth, so the water must be used carefully to make irrigation profitable.

Most of the wells have 8-inch casings, but a number of them have smaller casings. There are several 10-inch wells in the county. A typical 8-inch well pumps about 700 gallons of water per minute.[3]

Determining water needs.—Most row crops are damaged if the readily available moisture in the soil is less than 25 percent of the amount the soil is capable of holding. Row crops get enough moisture if the supply is at least 50 percent of the amount the soil will hold. To determine the amount of irrigation water needed on a particular field, you must first know the field capacity—that is, how much water the soil can hold. At field capacity, clay loams or loams hold about 2 inches of readily available moisture per foot, sandy loams and loamy sands hold about 1 inch, and fine sands hold about 0.7 inch.

A simple test may be used on loams or clay loams to estimate a soil's content of readily available moisture at a given time (*2*). First, remove a handful of loose soil from a spot between 6 and 12 inches below the surface. Then squeeze the soil in your hand. If the soil is too dry to form a coherent ball, the supply of readily available moisture is less than 25 percent of field capacity—so little that severe crop damage is likely. If the soil is moist enough to form a ball, toss the ball about 1 foot in the air and catch it in the palm of your hand. If the ball breaks within 5 tosses, the soil contains less than half as much readily available moisture as it could hold and therefore needs irrigation. If the ball is intact after 5 or more tosses, the soil contains more than half as much readily available moisture as it could hold and does not require immediate irrigation. When you have determined the approximate content of readily available moisture you can estimate the amount of water required to bring the supply to field capacity.

This simple field test is not as reliable on coarse sandy loams, loamy sands, or sands as on the medium textured and moderately fine textured soils. If sandy soils are tested, the balls of soil are generally fragile even when the moisture content is at field capacity.

Applying irrigation water.—Irrigation water should be applied so that it will penetrate uniformly. The soils should be leveled to a uniform grade; if leveling is impractical the irrigation rows should follow the contour. After irrigating the soil, the depth to which the water penetrates should be observed at regular intervals throughout the field to see if the water is being applied uniformly. Irrigation runs should be short enough to prevent excessive penetration of moisture at the beginning of the run and insufficient penetration at the foot of the run. A soil auger or soil tube can be used to check the depth to which the water is penetrating. Only enough water should be applied to penetrate to a depth of 3 or 4 feet, unless the soil needs to be leached of excess salts.

Drawdowns.—Irrigation wells should not be drilled too close together. Water moves very slowly through the water-bearing formation, so that an inverted cone of water depletion temporarily occurs beneath a well that has been pumping water. The depth of this depletion below the level of the static water table is known as the "drawdown."

Studies on the rate of drawdown have been conducted on the High Plains in Texas on the same water-producing formation as that from which irrigation water is obtained in Curry County. They show that a well pumping 1,000 gallons of water per minute for 30 days causes a drawdown of about 13 feet at a distance of 100 feet from the well; a drawdown of 10 feet at a distance of 200 feet; a drawdown of 3 feet at a distance of 1,000 feet; and a drawdown of 1 foot at a distance of 2,000 feet (*5*).

The number of wells in an area affects the amount of drawdown. If a well pumps 1,000 gallons of water per minute, the water table in an observation well at a distance of 200 feet would drop about 10 feet.

Assistance in determining the capacity of a well and in measuring the amount of water applied to the land can be obtained from the local representative of the Soil Conservation Service, the county agricultural agent, or a member of the staff of the State experiment station.

Management of Rangeland

Cattle raising is important to the agriculture of Curry County. About 36 percent of the land area, or 323,000 acres, was in range in 1950.

Rangelands should be managed so that they can produce high yields of forage indefinitely. Overstocking or other poor management practices cause the ranges to deteriorate until they become practically worthless for grazing. If the better grasses are overutilized, they decline or die out and the less desirable grasses and plants invade the range. The decline of soil-holding grasses may make the range subject to severe erosion by wind and water.

Areas of range that consist of similar soils, support similar kinds and amount of native vegetation, and need to be managed in about the same way are called range sites. Range specialists recognize six range sites in Curry County. The four most extensive ones are the Plains Upland site, the Sandy Plains site, the Shallow Upland site, and the Deep Sand site. The two less extensive ones are the Breaks site and the Heavy Bottomland site. The management needed for each range site is discussed in the following pages, and the soils included in each are listed under the name of the site.

[3] Measurements made by Richard L. Barber, Soil Conservation Service, using a weir placed in an irrigation ditch between 100 and 200 feet below the well.

FIGURE 17.—Location of irrigation wells in Curry County in July 1955, indicated by dots. In areas within solid lines, good wells are likely to be obtained. In areas within broken lines, good wells are less likely to be obtained; many "dry holes" have been drilled in these areas. In other parts of the county wells will probably furnish enough water for stock and domestic uses but usually not enough for irrigation.

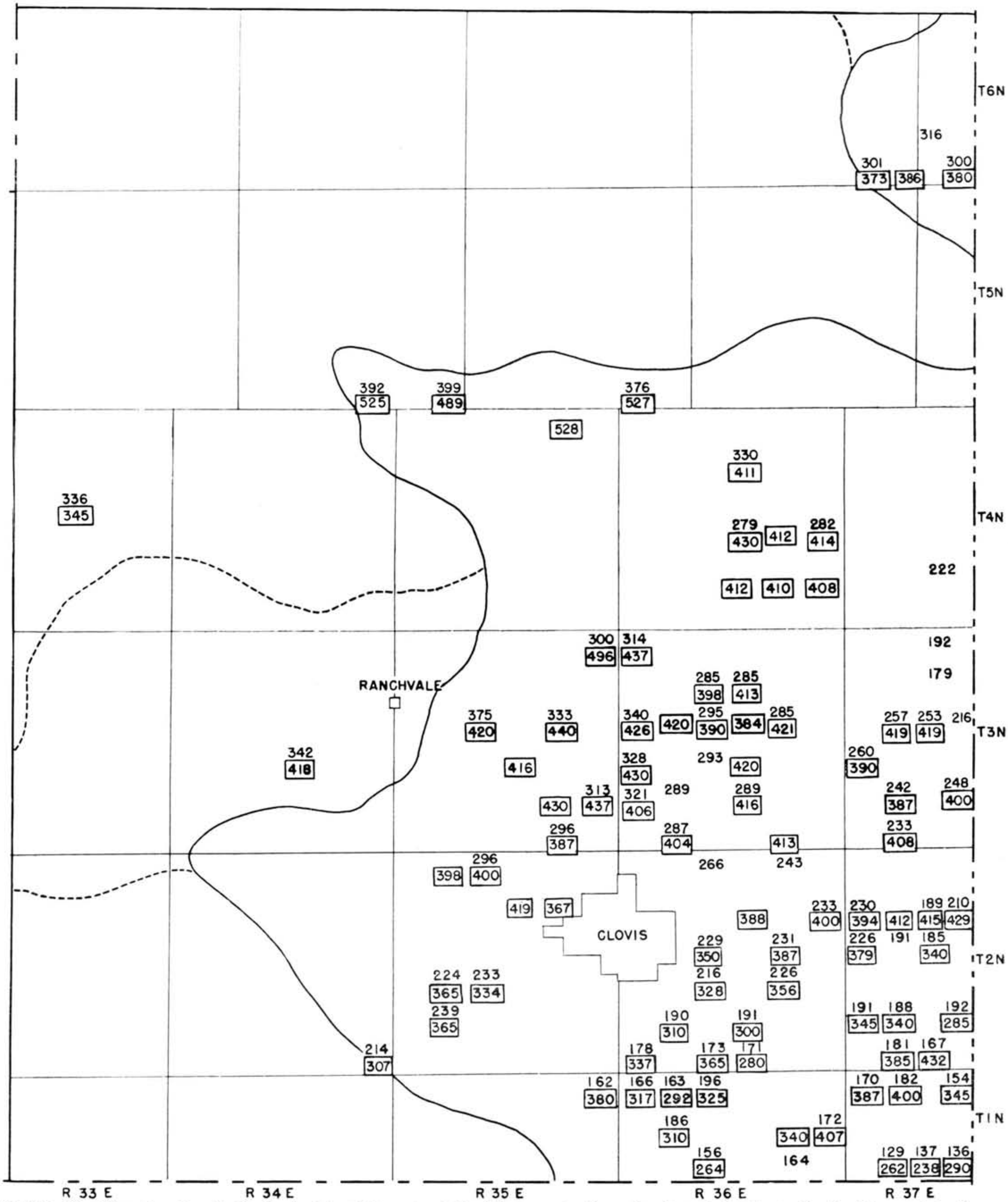

FIGURE 18.—Map showing depths in feet to static water table (figures standing alone) and depths to "redbed" material (figures in rectangles) in principal irrigated areas of Curry County.

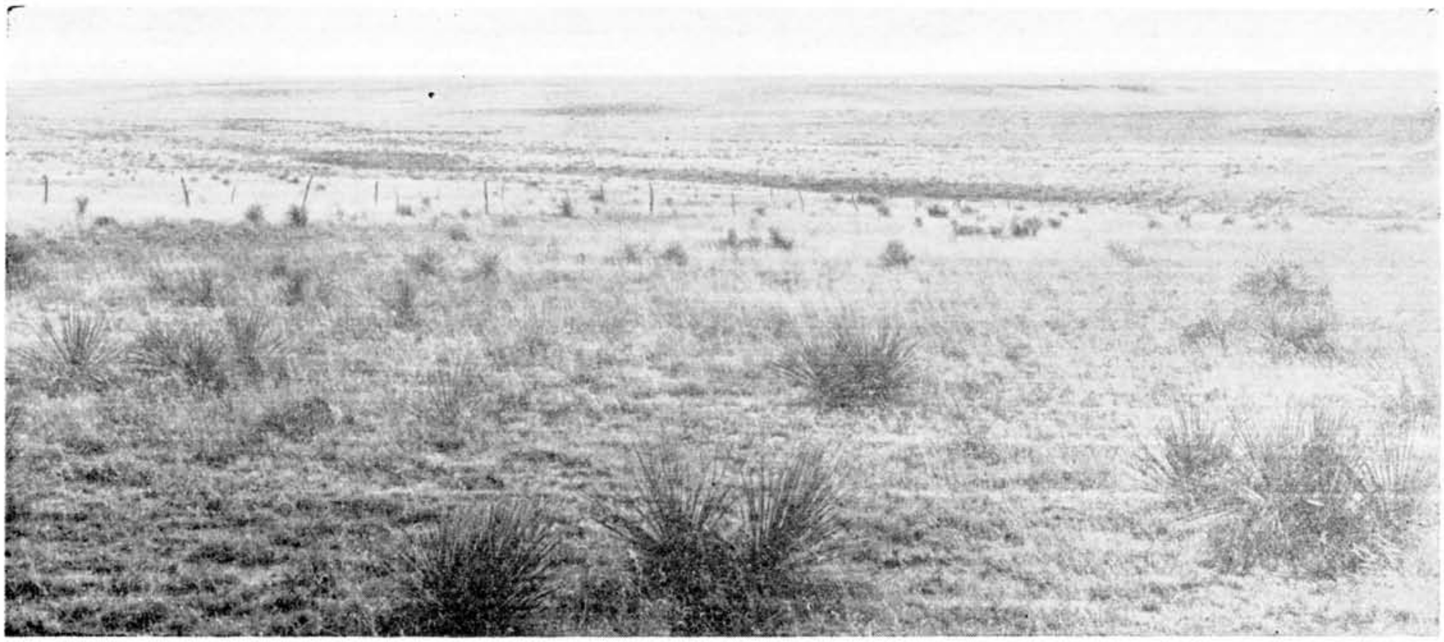

Figure 19.—Area of Plains Upland range site occupied by Mansker loam.

Plains Upland site

This range site is made up of deep and moderately deep, loamy hardland soils (fig. 19). The following soils are in this range site:

- Alluvial land.
- Amarillo loam, 0 to 2 percent slopes.
- Amarillo loam, 2 to 5 percent slopes.
- Clovis loam, 0 to 2 percent slopes.
- Clovis loam, 2 to 5 percent slopes.
- Mansker loam, 0 to 2 percent slopes.
- Mansker loam, 2 to 5 percent slopes.
- Mansker loam, 5 to 10 percent slopes.
- Pullman loam, 0 to 2 percent slopes.
- Pullman loam, 2 to 5 percent slopes.
- Pullman loam, thin solum, 0 to 2 percent slopes.
- Pullman loam, thin solum, 2 to 5 percent slopes.
- Spur loam.

The climax vegetation[4] is predominantly short grasses. Blue grama *(Bouteloua gracilis)*, buffalograss *(Buchloe dactyloides)*, and galleta *(Hilaria jamesii)* are the common species. Minor amounts of other grasses occur. Scattered yucca plants *(Yucca glauca)*, cholla, and pricklypear *(Opuntia* sp.*)*, and a few palatable forbs also grow on this range site.

The vigor of the blue grama may indicate trend in condition of the range. If the range is in excellent condition, blue grama grows in large vigorous clumps that look like bunchgrass. Buffalograss and galleta generally grow only in depressions. Little bluestem *(Andropogon scoparius)*, side-oats grama *(Bouteloua curtipendula)*, and needlegrass *(Stipa* sp.*)*, grow to some extent on this site. If blue grama and the other species named comprise from 75 to 100 percent of the vegetation, the range is in excellent condition.

[4] The final stage of plant succession for a given natural environment; the stage at which the composition of the plant community remains unchanged and can reproduce itself as long as the environment remains unchanged.

As the condition of the range declines, the amount of buffalograss and galleta increases and the range acquires a turflike appearance. Buffalograss is of less value for forage than blue grama, and galleta is less palatable. In the early stages of decline, the plant cover may be denser than when the range is in excellent condition, but the amount of usable forage declines.

If the condition of the range declines further, the better forage grasses are replaced by less palatable plants—three-awn grasses (*Aristida* spp.), ring muhly *(Muhlenbergia torreyi)*, snakeweed *(Guthierrezia* sp.*)*, and other low-value grasses and weeds. In this condition the site provides little useful forage. Continued use for grazing will increase the danger of wind and water erosion.

Management practices that maintain the vigor of the better forage plants should be used. Grazing should be regulated so that enough blue grama and other good forage grasses will grow to provide seed and furnish an adequate cover for the soil (fig. 20). Periodic deferment of grazing during the growing season helps to maintain and increase the abundance and vigor of the better grasses.

Contour furrowing and range pitting help to hold and conserve moisture. In places where the relief is favorable, water spreading by the use of dikes and diversion dams is effective, especially on the deeper soils.

Yields of range forage vary greatly from year to year. They depend on the amount of precipitation, its intensity, and the season in which it falls. Consequently, the rate of stocking should be varied as forage production varies with climatic conditions. The effect that previous use has had on the range must also be considered in establishing the rate of stocking.

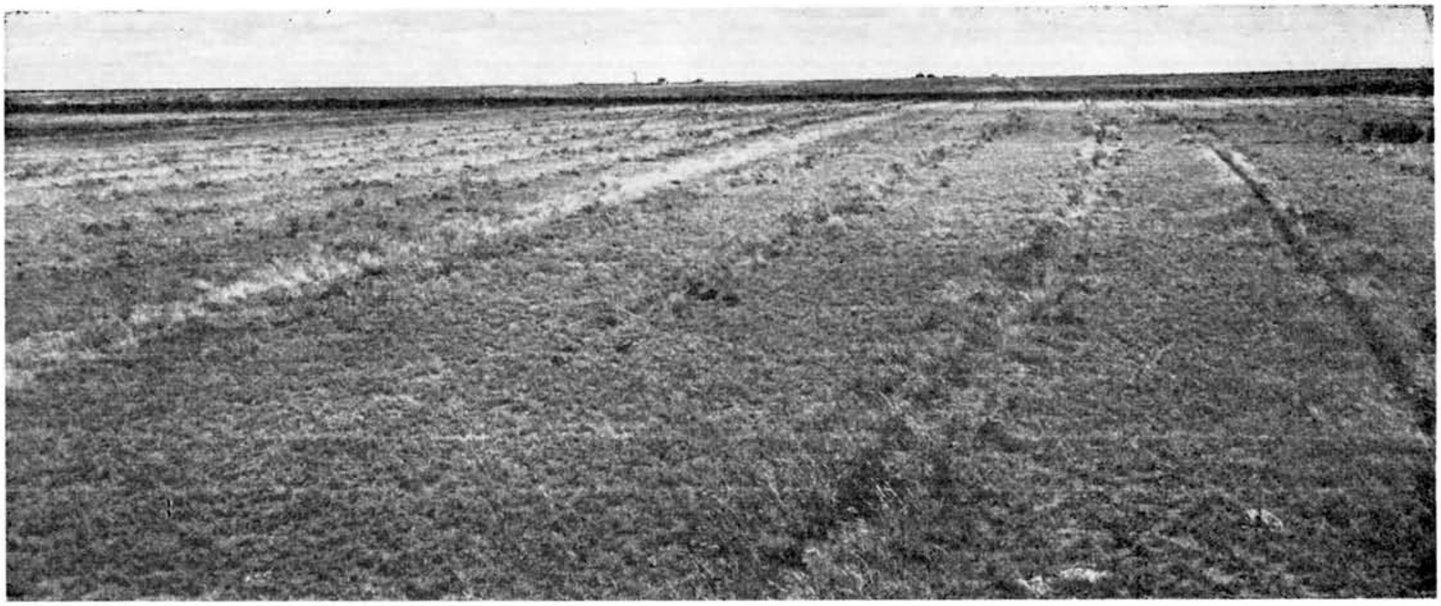

FIGURE 20.—Area of Plains Upland range site occupied by Pullman loam. Grazing has been controlled on this area and contour furrows have been used. Stand is densest along the furrows.

Sandy Plains site

This range site consists of sandy and moderately sandy soils that have medium-textured subsoils. The following soils are in the Sandy Plains site:

Amarillo fine sandy loam, 0 to 2 percent slopes.
Amarillo fine sandy loam, 2 to 5 percent slopes.
Amarillo loamy fine sand, 0 to 2 percent slopes.
Amarillo loamy fine sand, 2 to 5 percent slopes.
Amarillo loamy fine sand, 0 to 3 percent slopes, wind eroded.
Arch fine sandy loam.
Arch loamy fine sand.
Clovis fine sandy loam, 0 to 2 percent slopes.
Clovis fine sandy loam, 2 to 5 percent slopes.
Clovis loamy fine sand, 0 to 2 percent slopes.
Clovis loamy fine sand, 2 to 5 percent slopes.
Clovis loamy fine sand, 0 to 2 percent slopes, wind eroded.
Mansker fine sandy loam, 0 to 2 percent slopes.
Mansker fine sandy loam, 2 to 5 percent slopes.
Mansker fine sandy loam, 5 to 10 percent slopes.
Mansker loamy fine sand, 0 to 2 percent slopes.

There is more variety of grasses, shrubs, and palatable forbs on this site than on sites that consist of finer textured soils. The important mid grasses are side-oats grama, little bluestem, New Mexico feathergrass *(Stipa neomexicana)*, and needle-and-thread grass *(S. comata)*. The common short grasses are blue grama, hairy grama *(Bouteloua hirsuta)*, and black grama *(B. eriopoda)*. Yucca and sand sagebrush *(Artemisia filifolia)* are the common shrubs on this site. A little buffalograss and galleta may be found, but these grasses normally do not grow on this site.

If the range is grazed too closely the palatable mid and short grasses decline in abundance and vigor. The spaces left are filled by less desirable grasses, such as three-awn grass and ring muhly, and by woody plants —yucca, sand sagebrush, and mesquite (*Prosopis juliflora*).

When the range is in poor condition the plant cover may consist largely of yucca, sand sagebrush, mesquite, three-awn grass, ring muhly, red lovegrass *(Eragrostis oxylepis)*, tumble lovegrass *(E. sessilispica)*, and weeds. This site is likely to be permanently damaged through wind erosion. Widespread active erosion can be corrected only if grazing is stopped and the soil is reseeded. Seedings of the suitable grasses can restore the range to productivity (figs. 21 and 22).

Because they absorb moisture rapidly and release it to plants readily, the soils of the Sandy Plains site produce forage in drier years than soils on less sandy sites. In general, this site is one of the most productive in the county.

It is most important to restrict grazing enough to permit vigorous growth of the better grasses, which will protect the soil against wind erosion. Contour furrowing or pitting does little or no good on these sandy soils; in fact, if the vegetation is removed, the soil is likely to be damaged through wind erosion. Wells, tanks, and other structures that attract livestock should be located on finer textured soils if feasible.

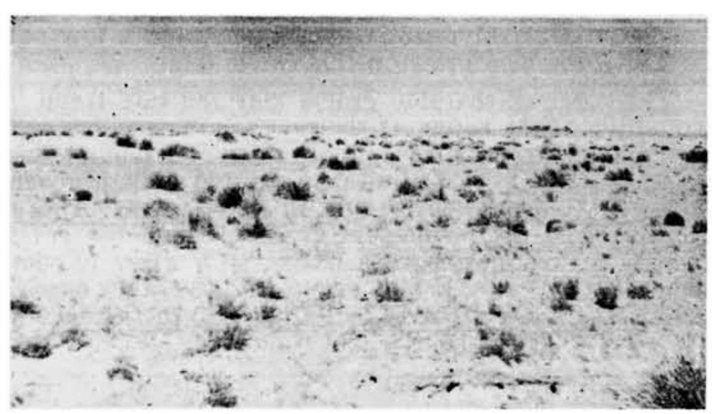

FIGURE 21.—Vegetation on the Sandy Plains range site depleted by overgrazing.

FIGURE 22.—Dense stand of weeping lovegrass reseeded on an area of the Sandy Plains range site next to the area shown in figure 21.

Shallow Upland site

This site consists of shallow, strongly calcareous soils that are underlain by hard, consolidated caliche. It is comprised of the following soils:

Potter fine sandy loam, 0 to 5 percent slopes.
Potter fine sandy loam, 5 to 20 percent slopes.
Potter loam, 0 to 5 percent slopes.
Potter loam, 5 to 20 percent slopes.

The climax vegetation on this site consists of short and mid grasses. If the range is in good or excellent condition, the common grasses are blue grama, side-oats grama, hairy grama, New Mexico feathergrass, and little bluestem.

If the range is in excellent condition the blue grama grows in large bunches as it does on the Upland Plains site. The palatable mid grasses—side-oats grama, New Mexico feathergrass, and little bluestem—are vigorous and occur in considerable quantities. Galleta and buffalograss grow only in small amounts along the bottoms of drainageways or in depressions. Undesirable plants such as three-awn grass, ring muhly, and snakeweed make up a very small part of the plant cover if the range is in excellent condition.

If the condition of the range declines because of overuse, side-oats grama, New Mexico needlegrass, and little bluestem are likely to diminish or die out and be replaced by three-awn grass and silver beardgrass (*Andropogon saccharoides*). Blue grama declines in vigor and becomes more turflike. Perennial shrubs and weeds such as yucca, snakeweed, fringed sagebrush (*Artemisia frigida*), and stemless pingue (*Hymenoxys acaulis*) become common.

If this range site deteriorates further, the desirable grasses disappear or diminish so that the vegetation consists almost entirely of unpalatable species and the site is practically worthless for grazing. The soils are then easily damaged by erosion. Little moisture penetrates the soil, and the range has a droughty appearance, even during years of normal rainfall.

Contour furrows may be practical on the more gently sloping parts of this range site. Control structures placed at the heads of eroding gullies and side draws help prevent them from enlarging.

The most effective management practices are regulation of the rate of stocking and rests from grazing at regular intervals. These measures promote continuous growth of desirable forage grasses.

Deep Sand site

This range site is made up of deep sandy soils. They are:

Brownfield fine sand, 0 to 2 percent slopes.
Brownfield fine sand, 0 to 2 percent slopes, wind eroded.
Drake fine sandy loam, 2 to 10 percent slopes.
Drake loamy fine sand, 2 to 10 percent slopes.
Springer loamy fine sand, 0 to 2 percent slopes.
Springer loamy fine sand, 2 to 5 percent slopes.
Tivoli fine sand.
Tivoli-Arch-Potter complex.

The vegetation on this site is more complex than that on the other major range sites of the county. The climax vegetation includes tall grasses such as sand bluestem (*Andropogon hallii*), Indiangrass (*Sorghastrum nutans*), big sandreed (*Calamovilfa gigantea*), and giant saccaton (*Sporobolus giganteus*). The mid and short grasses are side-oats grama, hairy grama, little bluestem, and sand paspalum (*Paspalum stramineum*). Common shrubs on this site are sand sagebrush, yucca, mesquite, squawbush (*Rhus trilobata*), and wild plum (*Prunus watsonii*). The optimum ground cover, if the range is in excellent condition, is about 35 to 40 percent.

If the range is closely grazed for several years, many of the palatable tall grasses are replaced by less desirable grasses such as sand dropseed, three-awn, red lovegrass, and tumble lovegrass. Also, shrubs and annual and perennial weeds may invade. The palatable grasses that remain generally grow only where they are protected by clumps of brush.

If the range is in poor condition, there are few perennial grasses, and these lack vigor. The vegetative cover consists mainly of shrubs and grasses that are low in forage value. To improve the condition of the range, it may be necessary to defer grazing, control the brush, and reseed.

When the vegetation on this range site is in good or excellent condition, it produces higher yields of forage than most of the other range sites (fig. 23). These sandy soils release moisture readily to plants. They support a better vegetative cover during droughts than do the finer textured soils, but if these soils are poorly managed, they are more likely to be damaged permanently by erosion.

Most of the tall grasses are injured or killed if grazed too closely. Grazing should be regulated so that

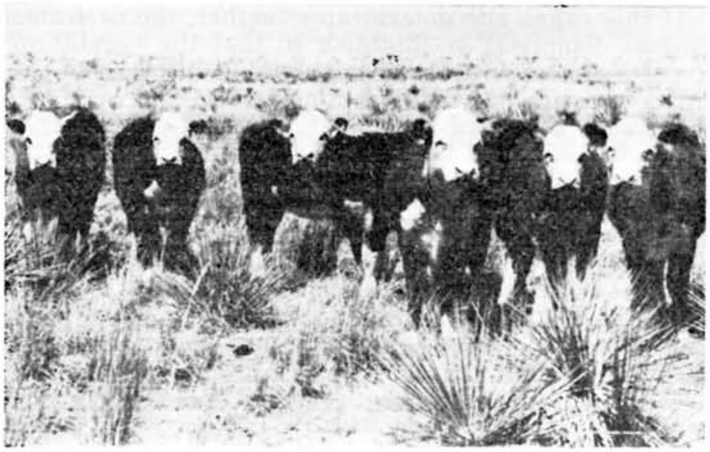

FIGURE 23.—Cattle on an area of Springer loamy fine sand on the Deep Sand range site.

the stubble of the tall grasses is at least 6 to 10 inches high at the end of the grazing season.

Breaks site

This range site is confined to the breaks below the caprock in the northeastern corner of the county and to the very steep, shallow, stony slopes along Tierra Blanca Creek and other large draws. The soil material is normally loam in texture and contains many pebbles and small boulders. Most of the range is steeply sloping and subject to rapid runoff. This range site is limited in extent. It consists of the following miscellaneous land types:

Stony rough land, mixed materials.
Stony rough land, Potter materials.

More varieties of plants grow on this range site than on any of the other sites. The climax vegetation includes big bluestem (*Andropogon gerardi*), Indiangrass, New Mexico feathergrass, needle-and-thread grass, side-oats grama, little bluestem, silver beardgrass, bush muhly (*Muhlenbergia porteri*), hairy grama, and blue grama.

Many shrubs grow just below the caprock. They include shrub oak (*Quercus* sp.), mountain-mahogany (*Cercocarpus montanus*), squawbush, yucca, wolfberry (*Lycium pallidum*), and feather peabush (*Dalea formosa*). Stands of juniper (*Juniperus* sp.) are common throughout the area.

When the vegetation on this range site is in excellent condition, the palatable tall and mid grasses predominate and grow vigorously. If the condition of the range declines, they decrease in abundance and vigor and undesirable species increase.

If the range is in poor condition, the palatable grasses, if present, are low in vigor. They grow only in places protected by rocks or brush. Many of the more palatable shrubs are heavily browsed by livestock. Erosion is severe.

The only sound management practices for this site are to stock the range at a suitable rate and to defer grazing periodically to permit the regrowth of palatable grasses.

Heavy Bottom-land site

This inextensive range site consists of moderately fine textured and fine textured soils. It occupies low terraces above playa bottoms and the finer textured areas on the bottoms of draws. The following soils are in this site:

Church clay loam.
Lofton clay loam.
Spur clay loam.

Soil Formation and Classification

Soil is the product of the action of climate and living organisms upon the parent material (*7*). The characteristics of the soil at any given point are determined by the interaction of the following factors: (1) The kind of parent material, (2) the climate under which the soil material has accumulated and existed since accumulation, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time the forces of soil development have acted on the soil material. A discussion of each of the factors of soil formation follows.

PARENT MATERIAL.—The soils of Curry County have developed from weathered particles of rocks and minerals. The proportions of the various rocks and minerals and the kind of weathering they have undergone help determine the characteristics of the soil. A soil formed through the physical weathering of rocks—freezing and thawing, wind erosion, and grinding by rivers and glaciers—differs from a soil formed through chemical weathering, even if both soils were derived from similar rock.

The manner in which the soil material was deposited affects soil formation. For example, a soil formed from materials deposited by streams differs from one formed from materials deposited by wind.

The texture of the parent material influences soil development. Soils derived from fine-textured materials generally have developed more rapidly and to a higher degree structurally than those derived from coarse-textured materials.

CLIMATE.—The climate—precipitation, temperature, humidity, and wind—significantly affects soil development. It is important as an agent in the weathering of rocks and the deposition of parent materials.

After a long period of development, a soil reaches a state of equilibrium with its environment. The characteristics of the soil that exists at equilibrium are determined to a considerable degree by the climate prevailing during the time the soil was forming.

PLANT AND ANIMAL LIFE.—The plant and animal life on and in the soil strongly influences the formation of a soil. The type and amount of vegetation are important. These are determined in part by the climate and in part by the kind of soil material. Vegetation adds organic matter to the soil, thereby influencing the structure and the physical condition of the soil. It influences the climatic conditions within the soil by providing shade and helping to retain moisture.

The soil micro-organisms cause the raw plant residues to decompose, a necessary function in soil forma-

tion. They strongly affect the chemistry of the soil, which in turn influences soil formation. They also convert plant nutrients to a form that is available to higher plants.

RELIEF.—Relief affects soil development through its effect on drainage and runoff. Other factors of soil formation being equal, the degree of profile development depends mainly on the average amount of moisture in the soil. The soils on steep slopes absorb less moisture and normally have less well developed profiles than soils on flats and in depressions. In addition, the soil-forming processes on steep slopes are retarded by the continual loss of material through erosion.

Relief also affects the kind and amount of vegetation on a soil. North-facing slopes receive less direct sunlight than south-facing slopes, so they lose less moisture through evaporation. As a result, soils on north-facing slopes have a denser vegetative cover and are generally more strongly developed.

TIME.—The development of the parent material into a mature, strongly developed soil is a slow process. The length of time required for the soil to reach a state of equilibrium with its environment depends upon the combined action of the soil-forming factors and the intensity of their action.

Soils develop slowly in a dry climate under a sparse vegetative cover but much more rapidly in a moist climate under dense vegetation. Recently deposited soil materials may show little profile development even if they occur in an environment conducive to rapid soil formation; but older soils in an environment much less conducive to rapid formation may exhibit considerable development.

Development of Soils in Curry County

The soils of Curry County formed under grass and under an average annual precipitation of 18 to 19 inches. Their parent materials appear to have been outwash sediments deposited during the Pliocene epoch and later reworked by wind.

The soils in southwestern Curry County were derived from coarse-textured parent materials that contained large amounts of fine sand and medium sand. To the east and to the north, the parent materials become increasingly finer textured. The soils of this county are more uniform in texture than is normal for soils formed from undisturbed alluvial outwash.

Tivoli soils.—These soils form the sandhills in the southwestern part of the county. The soil material has been reworked by wind, and most of the fine sediments have been sorted out and blown away, so that these soils now consist of deep, fine dune sand. Practically no profile development has taken place.

Springer soils.—These soils developed from wind-deposited sandy materials. Most of the fine sediments in the surface layer have been blown away. A moderate amount of fine material remains in the subsoil, which is normally a fine sandy loam.

These soils occupy smoother, less hilly relief than the Tivoli soils. They have weakly developed profiles.

Brownfield soils.—These soils occur in association with the Springer and Tivoli soils but were derived from wind-worked material that contained more clay. The surface layer consists of deep, fine sand, and the subsoil, of coarse sandy clay loam. The Brownfield soils exhibit a moderate degree of profile development but are not so well developed as soils derived from finer textured materials. They occupy nearly level to gently undulating relief.

Amarillo and Clovis soils.—These soils formed from moderately sandy, calcareous materials. They occur on nearly level to gently sloping or gently undulating relief. These soils are finer textured and have a more highly developed profile than the Brownfield soils. They are coarser textured than the Pullman soils and have a less well developed profile. Calcium carbonate, leached from the upper layers of these soils, has accumulated at depths of 2 to 5 feet and formed a lime-enriched zone. Except that they are sandier and the structure of their B horizon is weaker, the Amarillo loams and Clovis loams resemble the Pullman loams.

Pullman soils.—These soils formed on a 3- to 6-foot mantle of fine-textured, calcareous materials that appear to have been transported by wind. The fine-textured material overlies sandier material, probably outwash sediments of the Pliocene epoch. These soils are predominant in the northern half of Curry County. They occupy smooth, nearly level to gently undulating areas.

The Pullman soils have distinctly developed profiles. The surface soil is loam, and the subsoil is compact clay loam. The upper layers of these soils are leached of calcium carbonate, and an accumulation of lime occurs at depths beginning at about 2 to 4 feet.

Mansker soils.—These soils developed from medium-textured, calcareous materials similar to the materials underlying the Amarillo, Clovis, and Pullman soils. They are young soils and show little or no profile development. The Mansker soils generally occur along slopes and along the upper margins of draws and playas. The upper layers have been removed through erosion, so the unaltered materials in the substratum are exposed.

Potter soils.—The Potter soils overlie hard caliche. They developed from weathered caliche intermixed with materials deposited by wind. Lenses of caliche occur throughout the soil and are exposed in places. These soils are very shallow and have undeveloped profiles.

Spur soils and Alluvial land.—These young soils formed from moderately fine textured to medium textured alluvium that washed from higher lying Mansker, Amarillo, and Pullman soils. They are loam, clay loam, and fine sandy loam in texture. The clay loam soil has very weak profile development, and the fine sandy loams have almost no profile development. These soils occupy the bottoms of draws throughout the county.

Lofton and Church soils.—These soils have developed from fine-textured materials, derived from the residuum of Pliocene outwash materials that were intermixed with fine sediments washed from higher lying soils. The soils occupy low, nearly level benches next to the bottoms of playas. Runoff from the higher slopes collects on these soils, so the soils have developed under wetter conditions than are normal in this

area. Consequently, the soil materials are highly weathered and the soil profiles are well developed.

Arch soils.—These soils formed from medium-textured calcareous alluvium that probably was deposited early during the Pleistocene epoch. They occur mainly on broad, level flats in the southwestern part of the county. Calcium carbonate, which appears to have been deposited by shallow ground water, has accumulated in the Arch soils. The soils show little profile development.

Drake soils.—These sandy, strongly calcareous soils occupy low dunes of wind-accumulated sands that have been removed from areas of the Arch and Church soils. They normally occupy the leeward margins (northeast and east) of areas of Arch and Church soils. Their profiles are virtually undeveloped.

Classification of Soils

Curry County is in an area that is transitional between the Reddish-Chestnut soil zone and the Reddish-Brown soil zone.

Table 3 shows how the soil series of the county are classified into great soil groups and summarizes some factors that affected the development of the soils.

Geology

The outstanding event in the geologic history of Curry County was the deposition of the Ogallala formation, the water-bearing stratum.

The Ogallala formation is the principal source of irrigation water in Curry County. It was formed from materials deposited more than a million years ago, during the early Pliocene epoch. To understand how this underground formation developed, it is necessary to review the geologic history of the area.

About 180 million years ago, shortly before the uplift of the Appalachian Mountains, the area that is now eastern New Mexico and western Texas was covered by a shallow sea. Marine sediments deposited during this period formed what are known as the Permian "Red Beds." While the Appalachian Mountains were being formed, the High Plains area rose above the level

TABLE 3.—*Great soil groups and important characteristics of soils*

Great soil group and series	Physiographic position	Relief	Parent material	Native vegetation
Reddish Chestnut:				
Amarillo	High plains	Nearly level to gently undulating.	Sediments deposited by wind and water.	Short and mid grasses.
Brownfield[1]	High plains	Level to undulating	Sandy sediments deposited by wind and water.	Tall and short grasses, sand sagebrush, yucca.
Clovis	High plains	Nearly level to gently undulating.	Sediments deposited by wind and water.	Short and mid grasses.
Lofton	Depressions	Smooth and nearly level	Fine loess and alluvial sediments.	Short grasses.
Pullman	High plains	Level to gently sloping	Loess	Short grasses.
Reddish Brown:				
Springer	High plains	Level to undulating	Sandy sediments deposited by wind.	Short and mid grasses, yucca.
Calcisols:[2]				
Arch	Broad, shallow depressions.	Smooth and level	Calcareous alluvium	Short and mid grasses.
Church	Depressions	Smooth and nearly level.	Sediments deposited by water.	Short grasses.
Mansker	Slopes of draws and playas.	Nearly level to sloping	Calcareous sediments deposited by wind.	Short and mid grasses.
Regosols:				
Drake	Sand dunes	Undulating to hilly	Calcareous sediments deposited by water.	Mid and tall grasses, sand sagebrush, yucca.
Tivoli	Sand hills	Rolling to hilly	Sands deposited by winds.	Mid and tall grasses, sand sagebrush, yucca.
Lithosols:				
Potter	Slopes of draws and playas.	Gently undulating to sloping.	Caliche	Short and mid grasses.
Alluvial soils:				
Spur[3]	Bottoms of drainageways.	Level to gently sloping	Local alluvium	Short grasses.

[1] Similar to Reddish-Brown soils in certain characteristics.
[2] Tentative great soil group (*4*).
[3] Similar to minimal Chestnut soils in certain characteristics.

of the sea. Streams flowing over the exposed Permian rocks eroded fine-textured materials and redeposited them along the flood plains. These materials formed the Triassic "Red Beds," the impervious stratum that underlies the Ogallala formation.

During the Cretaceous period, a shallow arm of the sea again partially submerged the High Plains. Sand, clay, and limestone were deposited over much of the area.

The formation of the Rocky Mountains was the next significant development. Swift streams from the mountains cut valleys and canyons through the Cretaceous rock into the underlying Triassic "Red Beds." Most of the Cretaceous material that had been deposited on the High Plains was washed away.

When the Rocky Mountains reached their maximum height and began to erode, coarse gravelly material was carried considerable distances by the swift streams. As the mountains were worn down, the streams became less swift and began to deposit gravel, sand, and silt near their sources. These deposits formed alluvial fans of coarse gravelly material along the foot slopes of the mountains; the finer materials were transported and spread out farther to the east. The Ogallala formation developed from these deposits of outwash material, which gradually built up to about the present level of the High Plains.

The materials of the Ogallala formation were deposited just before the beginning of the ice age. The glaciers did not advance as far south as New Mexico, but during the ice age a much moister climate prevailed in this area. As a result of increased precipitation, large streams formed and flowed across the Ogallala formation. These rivers gradually cut through the Ogallala formation and into the underlying redbeds. A discontinuous, relatively steep escarpment, facing west and north and known as the caprock, marks the boundary between the relatively uneroded High Plains to the east and the more deeply eroded valleys of the Pecos and Canadian Rivers to the west.

The source of the underground water in Curry County is not an underground river or lake, but the saturated beds of sand and gravel in the lower part of the Ogallala formation. The Triassic "Red Beds" that underlie the Ogallala formation are impervious, so it is unlikely that water could be obtained from any of the lower strata. During the period of nearly a million years when the Ogallala was developing, water from the eastern border of the Rocky Mountains was being stored in its water-bearing stratum. When the Ogallala formation was cut off from the mountains, its source of water was blocked. At present the supply of underground water probably is replenished only by rain or snow that falls on the High Plains.

The water table slopes very gently to the southeast, and the water moves very slowly. The natural rate of movement is probably not more than 1 or 2 feet a day. Before wells were drilled for irrigation, the water was being discharged at about the same rate as it was being replenished, mainly by springs along the southeastern border of the High Plains. At present water is probably being pumped for irrigation faster than it is being restored.

The amount of water available varies considerably from place to place because the thickness of the water-producing stratum and the depth to the redbeds vary. Apparently the redbeds are undulating and in some areas may rise nearly to, or above, the static water table (*6*).

Physiography, Drainage, and Relief

Curry County is in the northwestern part of a broad, nearly level plateau called the *Llano Estacado*—the Staked Plain. It is in the High Plains section of the Great Plains province.

In general, the topography is smooth and very gently sloping to gently undulating. The land slopes gently to the southeast. Elevations, in a distance of 45 miles, range from about 4,700 feet in the northwestern part of the county to about 4,150 feet in the southeastern part.

Running Water Draw, Blanco Creek (Frio Draw), and Tierra Blanca Creek, which cross the county from west to east, comprise the major drainage pattern of the county. In places, these drainageways have worn 80 feet below the level of the plains (fig. 24). Most of the entrenchment occurred during periods of considerably increased precipitation, which coincided with glaciation in the areas to the north. The streams in these drainageways flow only for short periods following heavy rains.

Running Water Draw and Blanco Creek cross the central part of the county. Running Water Draw is a part of the drainage system of the Brazos River. Tierra Blanca Creek, in northeastern Curry County, and Frio Draw drain into the Red River.

Alamosa Creek, which for a short distance cuts into the western margin of the county, provides the only drainage westward to the Pecos River. Blackwater Draw crosses the southwestern corner of the county.

Before the Nebraskan continental glaciation occurred to the north, in the early Pleistocene epoch, what is now known as Blackwater Draw (Fidlers Draw) was the principal drainage channel of the Brazos River. The channel of the Pecos River shifted and intercepted the headwaters of the Brazos River, causing the flow of the Pecos River to increase so that the waters cut rapidly into the rock to form the Pecos Valley.

The old channel of the Brazos River to the east was left stranded at a much higher level than the Pecos Valley. Before this occurred Alamosa Creek had been a tributary of the Brazos River. After the waters of the Brazos River were diverted from their old channel, the intermittent flow from Alamosa Creek built up an alluvial fan that eventually blocked the old river channel. Subsequent erosion reversed the original direction of the flow into old Brazos drainageway, and Alamosa Creek was thus diverted westward into the Pecos Valley.

Because the area is nearly level, drainage water not carried off by the larger draws flows into the many playas that occur throughout the county. These flat-bottomed basins contain water after heavy rains. In

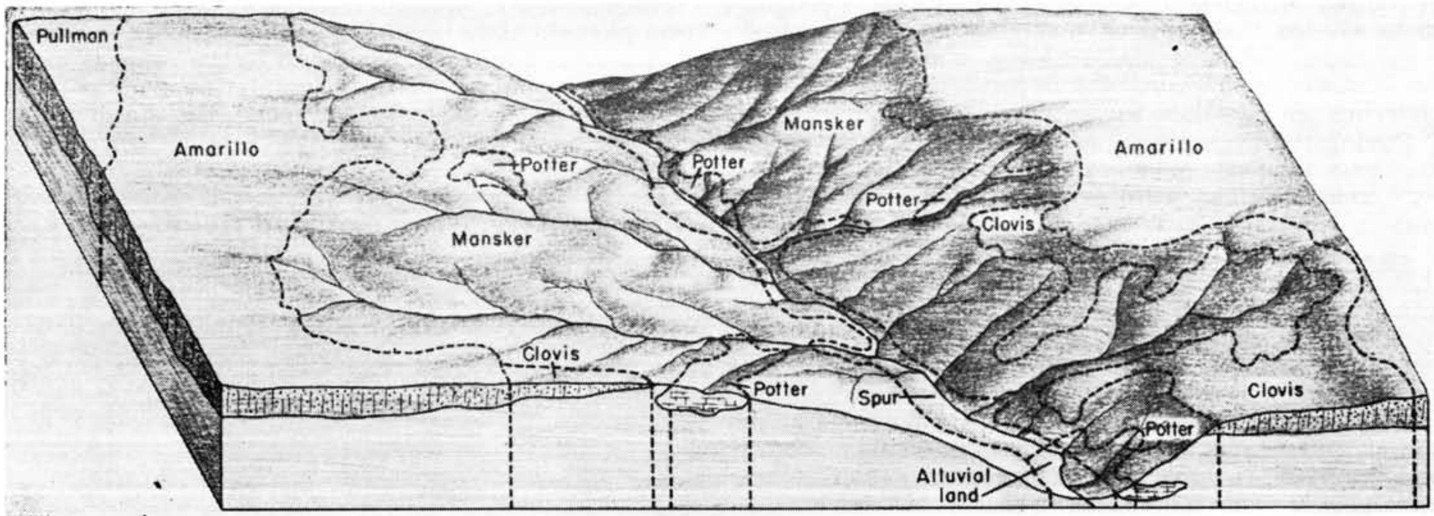

FIGURE 24.—Typical cross section of soils extending across Running Water Draw in central Curry County.

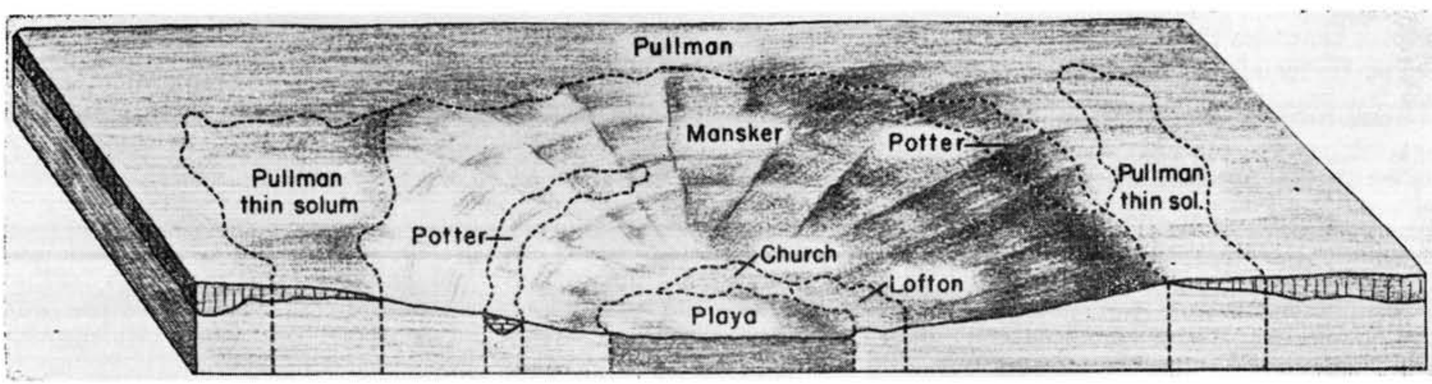

FIGURE 25.—Diagram showing pattern of soils surrounding a playa in the northern part of Curry County.

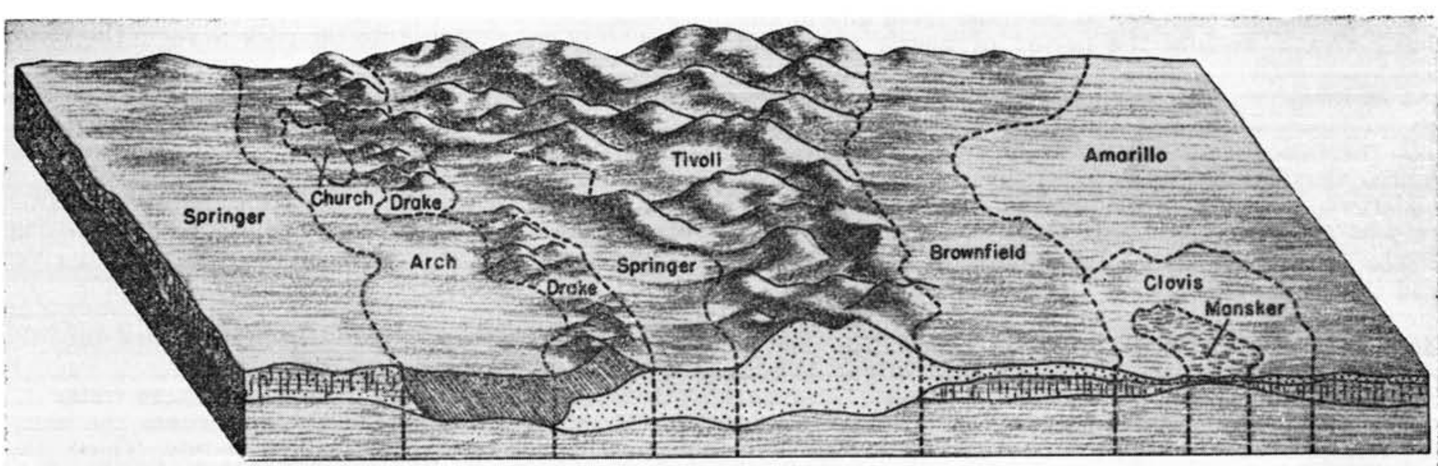

FIGURE 26.—Typical cross section of sandy soils in southwestern Curry County.

places they are shallow and only a few hundred feet wide or up to 40 feet deep and a half-mile or more across. They are generally more or less oval. The playas occur mainly in the northern half of the county in areas of finer textured soils. They probably were formed by deflation through wind action. They may have once been buffalo wallows from which the powdery soil materials were blown during dry periods.

Low subdued ridges occur in some places on the east (leeward) side of the larger playas in areas of Pullman soils. The soils in these slightly elevated areas are similar to those of the surrounding areas and probably have developed on a mantle of loess (fig. 25).

An area of sandhills occurs in southwestern Curry County (fig. 26). They lie mainly in a belt, 2 to 4 miles wide, along the northern side of, and roughly paralleling, Blackwater Draw (Fidlers Draw). They consist of large dunes of wind-drifted sands. The relief is rolling or hilly; the larger hills are 50 feet high. Most of the sandhills are stabilized by vegetation, but a few are bare and are actively eroding.

Climate

The climate of Curry County is semiarid. The summers are warm and predominantly clear, and the winters are fairly mild. The normal monthly, seasonal, and annual temperature and precipitation, compiled from records of the United States Weather Bureau Station at Clovis, are given in table 4.

The average annual precipitation is between 18 and 19 inches. Most of the precipitation comes in the spring and summer, frequently in the form of local thunderstorms. Only about 11 inches of snow falls each year. Hailstorms may severely damage crops during spring and early summer. Severe windstorms are common late in winter and in spring.

Temperatures range from an occasional reading of slightly above 100° F. to slightly below 0°. The average length of the growing season is 195 days. The average date of the last killing frost in spring is April 16, and that of the first in fall, October 28.

TABLE 4.—*Normal temperature and precipitation at Clovis, Curry County, N. Mex.*

[Elevation, 4,280 feet]

Month	Temperature[1]			Precipitation[2]			
	Average	Absolute maximum	Absolute minimum	Average	Total for the driest year (1917)	Total for the wettest year (1941)	Average snowfall
	°F.	°F.	°F.	Inches	Inches	Inches	Inches
December	37.9	78	−9	0.58	0	0.43	3.1
January	36.9	77	−8	.39	.44	.35	2.3
February	41.5	81	−17	.39	.06	.25	1.7
Winter	38.8	81	−17	1.36	.50	1.03	7.1
March	47.1	90	−4	.59	.07	2.48	1.7
April	57.0	99	12	1.28	.57	3.43	.5
May	65.9	101	28	2.36	1.13	11.87	.1
Spring	56.7	101	−4	4.23	1.77	17.78	2.3
June	74.9	109	36	2.62	0	8.57	(3)
July	78.5	109	52	2.49	2.35	4.60	(3)
August	77.2	110	46	2.90	1.77	2.02	(3)
Summer	76.9	110	36	8.01	4.12	15.19	(3)
September	69.9	105	31	2.25	1.10	6.79	(3)
October	59.0	98	13	1.85	0	5.96	.2
November	46.4	85	0	.49	.07	.16	1.3
Fall	58.4	105	0	4.59	1.17	12.91	1.5
Year	57.7	110	−17	18.19	7.56	46.91	10.9

[1] Average temperature based on a 38-year record, through 1955; highest temperature on a 40-year record, and lowest temperature on a 39-year record, through 1952.

[2] Average precipitation based on a 42-year record, through 1955; wettest and driest years based on a 45-year record, in the period 1911–1955; snowfall based on a 40-year record, through 1952.

[3] Trace.

Laboratory Analysis of Soils

Table 5 shows the results of chemical analysis of nine soils mapped in Curry County. Table 6 shows the mechanical and chemical analysis of the same soils.

TABLE 5.—*Chemical analysis*

Soil and location	Horizon	Depth	Cation exchange capacity (NH_4AC)	Exchangeable cations			
				Ca	Mg	Na	K
		Inches	*me./100 gm.*	*me./100 gm.*	*me./100 gm.*	*me./100 gm.*	*me./100 gm.*
Amarillo fine sandy loam (Location: Approximately 800 ft. north and 150 ft. west of the SE corner of NE ¼ sec. 4, T. 1 N., R. 37 E.)	A_p	0–5	6.2	3.1	2.1	0.11	0.9
	B_1	5–16	7.6	5.9	.8	.11	.8
	B_{21}	16–35	11.8	7.7	2.9	.12	1.1
	B_{2ca}	35–42	11.4	8.4	1.7	.13	1.2
	C_{cam}	42–50	[3]	[3]	[3]	[3]	[3]
	C_{ca1}	50–60	[3]	[3]	[3]	[3]	[3]
	C_{ca2}	60–84	[3]	[3]	[3]	[3]	[3]
	C	84–108	[3]	[3]	[3]	[3]	[3]
Amarillo fine sandy loam (Location: ¼ mi. south and approximately 200 ft. east of the NW corner of sec. 9, T. 1 N., R. 37 E.)	A_p	0–6	5.4	2.4	1.8	.11	1.1
	B_1	6–10	8.6	6.8	.7	.14	1.0
	B_{21}	10–24	11.0	7.0	2.9	.11	1.0
	B_{22}	24–35	9.6	5.4	3.1	.16	.9
	B_{23}	35–41/46	10.3	6.5	2.4	.15	1.2
	C_{ca1}	41/46–60	[3]	[3]	[3]	[3]	[3]
	C_{ca2}	60–81	[3]	[3]	[3]	[3]	[3]
Clovis fine sandy loam (Location: Approximately 400 ft. south and 300 ft. east of the NW corner of sec. 10, T. 1 N., R. 37 E.)	Overblow	0–6	5.5	1.6	3.0	.07	.8
	B_1	6–11	10.6	7.7	2.2	.11	.6
	B_2	11–18/26	14.9	9.8	4.2	.13	.8
	B_3	18/26–28/32	11.6	8.8	1.8	.12	.9
	C_{ca1}	28/32–42	[3]	[3]	[3]	[3]	[3]
	C_{ca2}	42–56	[3]	[3]	[3]	[3]	[3]
	C	56–70	[3]	[3]	[3]	[3]	[3]
Clovis fine sandy loam (Location: Approximately 250 ft. south and 100 ft. east of the SW corner of the NW ¼ sec. 3, T. 1 N., R. 37 E.)	A_p	0–8	8.8	4.4	3.4	.11	.9
	B_2	8–17	15.4	9.4	5.0	.10	.9
	B_3	17–27/38	13.4	9.7	2.7	.12	.9
	C_{ca}	27/38–60	[3]	[3]	[3]	[3]	[3]
	C	60–78	[3]	[3]	[3]	[3]	[3]
Amarillo loam (Location: 1,100 ft. north and 100 ft. east of the SW corner of the NW ¼ sec. 27, T. 3 N., R. 37 E.)	A_p	0–6	10.0	6.2	2.2	.25	1.3
	B_1	6–14	14.7	9.3	4.2	.22	1.0
	B_2	14–21	16.9	10.5	4.9	.16	1.3
	B_{31}	21–37	14.2	10.0	2.9	.14	1.2
	B_{32}	37–42	13.6	10.5	1.6	.22	1.3
	C_{ca}	42–60	[3]	[3]	[3]	[3]	[3]
	C	60–72	[3]	[3]	[3]	[3]	[3]
Pullman loam (Location: Approximately 400 ft. south and 300 ft. east of the NW corner of sec. 6, T. 4 N., R. 36 E.)	A_p	0–6	16.4	11.8	2.9	.14	1.6
	B_2	6–19	21.6	14.8	4.6	.12	1.1
	B_{31}	19–30	17.1	13.2	2.7	.16	1.0
	B_{32}	30–52	11.5	8.5	1.8	.29	.9
	C_{ca}	52–72	[3]	[3]	[3]	[3]	[3]
	C	72–90	[3]	[3]	[3]	[3]	[3]
Pullman loam (Location: Approximately 1,440 ft. north and 660 ft. east of the SW corner of the SE ¼ sec. 1, T. 4 N., R. 36 E.)	A_{p1}	0–4	12.9	8.5	2.8	.12	1.5
	B_{21}	4–6	14.9	9.4	4.5	.10	.9
	B_{22}	6–16	21.1	15.2	4.9	.13	.9
	B_{31}	16–32	19.7	14.9	3.9	.13	.8
	C_1	32–50	15.3	10.4	3.9	.19	.9
	C_{ca}	50–70	[3]	[3]	[3]	[3]	[3]
	C	70–88	[3]	[3]	[3]	[3]	[3]
Pullman loam, thin solum (Location: Approximately ¼ mi. north and 200 ft. west of the center of sec. 22, T. 5 N., R. 35 E.)	A_p	0–6	16.1	11.0	3.7	.10	1.3
	B_2	6–17	20.6	14.2	5.1	.11	1.2
	B_3	17–27/32	15.3	11.7	2.4	.13	1.1
	C_{ca1}	27/32–50	[3]	[3]	[3]	[3]	[3]
	C_{ca2}	50–68	[3]	[3]	[3]	[3]	[3]
	C	68–90	[3]	[3]	[3]	[3]	[3]
Pullman loam, thin solum (Location: 100 ft. north and 150 ft. east of the SW corner of the NW ¼ sec. 14, T. 7 N., R. 35 E.)	A_p	0–4	13.5	11.4	1.0	.34	.8
	B_{21}	4–6	18.2	14.4	2.8	.09	.9
	B_{22}	6–11	18.3	13.5	3.9	.07	.8
	B_3	11–15	13.8	11.3	1.7	.10	.7
	C_{ca}	15–39	[3]	[3]	[3]	[3]	[3]
	C_1	39–57	[3]	[3]	[3]	[3]	[3]
	C_2	57–75	[3]	[3]	[3]	[3]	[3]
	C	75–90	[3]	[3]	[3]	[3]	[3]

[1] Estimated from conductivity of saturated paste in Bureau of Soils cup.
[2] Determined colorimetrically by Graham's method.

of important soils

Exchangeable Na	Electrical conductivity (Ec x 10[3])	Salt[1]	pH: Saturated paste	pH: 1:5	pH: 1:10	$CaCO_3$	Gypsum	Organic matter: Organic carbon[2]	Organic matter: Nitrogen	Organic matter: C/N	Moisture held at— 1/3 atmosphere	Moisture held at— 15 atmosphere	Moisture at saturation
Percent		Percent				Percent	Percent	Percent	Percent		Percent	Percent	Percent
1.77	0.55	0.02	7.4	7.7	8.2	0	0	0.68	0.042	16.19	12.00	5.61	27.2
1.45	.40	.02	7.3	7.6	7.7	0	0	.60	.048	12.50	18.10	7.99	45.6
1.02	.31	.02	7.2	7.6	7.7	.5	0	.38	.045	8.44	24.17	10.76	42.0
1.05	.40	.05	7.7	8.3	8.8	1.9	0	.31	.036	8.61	21.36	9.65	35.2
(3)	(3)	.02	8.0	8.6	8.8	59.8	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.02	8.0	8.7	8.9	56.5	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.02	7.9	8.5	9.0	57.9	.3	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.07	7.9	8.5	8.6	27.3	0	(3)	(3)	(3)	(3)	(3)	(3)
2.04	.58	.02	7.4	7.9	8.6	0	0	.46	.042	10.95	11.85	5.49	26.8
1.63	.77	.07	7.0	7.7	7.8	0	0	.59	.059	10.00	16.76	8.80	35.2
1.00	.40	.02	7.3	7.6	7.7	0	0	.37	.034	10.88	21.42	10.04	40.0
1.14	.35	.02	7.3	7.7	7.9	0	0	.19	.036	5.28	19.05	8.80	36.6
1.46	.48	.02	7.4	8.1	8.2	.5	0	.20	.042	4.76	18.64	9.17	36.0
(3)	(3)	.02	7.8	8.6	8.8	35.5	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.02	7.8	8.6	8.9	47.1	0	(3)	(3)	(3)	(3)	(3)	(3)
1.27	.48	.02	7.6	8.2	8.4	0	0	.41	.046	8.91	9.32	3.45	26.8
1.04	.52	.02	7.4	7.8	7.9	.1	0	.56	.062	9.03	16.97	8.16	36.0
.87	.42	.02	7.7	7.8	7.8	.1	0	.43	.059	7.29	19.97	9.55	35.6
1.03	.38	.02	8.0	8.3	8.6	12.0	0	.30	.039	7.69	23.51	9.78	36.8
(3)	(3)	.02	8.3	8.5	8.8	66.3	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.02	8.4	8.6	9.0	37.3	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.02	8.3	8.7	8.9	19.0	0	(3)	(3)	(3)	(3)	(3)	(3)
1.25	.48	.02	8.0	8.4	8.5	.5	0	.44	.059	7.46	15.29	6.18	30.0
.65	.48	.02	7.8	8.0	8.0	.1	0	.58	.056	10.36	25.39	10.01	41.2
.89	.80	.02	8.0	8.4	8.5	10.8	0	.31	.036	8.61	24.36	9.48	37.2
(3)	(3)	.02	8.1	8.8	9.0	45.9	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.08	8.0	8.5	9.1	36.8	0	(3)	(3)	(3)	(3)	(3)	(3)
2.5	.57	.05	7.8	8.0	8.5	0	0	.87	.059	14.75	18.20	6.74	32.4
1.5	.47	.05	7.3	7.7	8.0	0	0	.73	.067	10.89	25.54	10.83	39.6
.9	.38	.05	7.4	8.0	8.2	.6	0	.57	.064	8.98	33.47	13.79	50.4
.9	.39	.02	7.8	8.2	8.6	3.8	0	.26	.028	9.29	31.13	11.05	42.8
1.6	.40	.07	7.8	8.3	8.5	1.4	0	.30	.025	12.00	27.66	10.40	43.2
(3)	(3)	.02	8.1	8.7	9.0	57.8	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.13	7.9	8.3	8.6	3.8	.7	(3)	(3)	(3)	(3)	(3)	(3)
.9	.97	.10	7.5	7.9	8.2	.1	0	.70	.078	8.97	26.54	10.47	44.4
.6	.51	.10	7.6	8.1	8.3	.2	0	.77	.062	12.41	30.47	13.68	50.0
.9	.42	.07	8.0	8.4	8.8	9.9	0	.43	.059	7.29	29.27	12.00	45.6
2.5	.47	.07	8.0	8.5	8.7	23.8	0	.24	.042	5.71	25.99	10.01	46.0
(3)	(3)	.10	7.9	8.5	9.0	41.5	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.12	7.7	8.3	8.8	42.3	(4)	(3)	(3)	(3)	(3)	(3)	(3)
.9	.70	.07	7.0	7.4	7.8	0	0	.76	.115	6.61	20.24	7.60	34.0
.7	.75	.08	7.3	7.4	8.0	.3	0	.75	.087	8.62	23.81	10.40	36.0
.6	.78	.13	7.9	8.0	7.9	0	0	.64	.070	9.14	31.14	14.53	46.0
.7	.40	.08	8.0	8.1	8.4	4.1	0	.34	.042	8.09	30.25	12.09	40.4
1.2	.44	.07	8.1	8.2	8.8	26.8	0	.19	.028	6.79	24.68	10.36	37.2
(3)	(3)	.07	8.3	8.6	9.1	65.5	.4	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.12	8.3	8.8	9.0	20.1	.1	(3)	(3)	(3)	(3)	(3)	(3)
.6	1.95	.13	7.1	7.2	7.9	0	0	.93	.098	9.49	24.55	10.34	41.6
.5	1.80	.09	7.3	7.6	7.9	0	0	.73	.089	8.20	28.22	13.26	43.2
.8	.46	.05	7.9	8.3	8.7	5.3	0	.30	.036	8.33	26.03	11.37	42.4
(3)	(3)	.02	8.0	8.4	8.8	61.8	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.10	8.0	8.5	8.9	56.0	.5	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.13	7.9	8.5	8.9	37.4	.2	(3)	(3)	(3)	(3)	(3)	(3)
2.5	.70	.07	8.1	8.4	8.6	.5	0	.80	.081	9.88	18.94	8.18	33.2
.4	.85	.10	7.9	8.1	8.3	.3	0	.78	.078	10.00	27.12	10.79	42.8
.4	.71	.07	7.9	8.0	8.4	.5	0	.64	.089	7.19	25.76	12.99	44.8
.7	.62	.09	7.8	8.4	8.5	21.1	0	.34	.067	5.07	24.70	11.06	41.2
(3)	(3)	.07	8.2	8.6	8.9	56.1	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.12	8.1	8.6	9.0	34.0	0	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.14	8.1	8.4	8.9	25.0	(4)	(3)	(3)	(3)	(3)	(3)	(3)
(3)	(3)	.17	8.0	8.3	8.6	28.0	(4)	(3)	(3)	(3)	(3)	(3)	(3)

[3] Not analyzed.
[4] Trace.

TABLE 6.—*Mechanical and chemical analysis of important soils.*

[PO_4 = carbon dioxide soluble PO_4; K = 0.025 normal soluble K]

Soil and location	Horizon	Depth	Very coarse sand (2–1)	Coarse sand (1–0.5)	Medium sand (0.5–0.25)	Fine sand (0.25–0.10)	Very fine sand (0.10–0.05)	Total sand	Silt (0.05–0.002)	Clay (<0.002)	Textural class	PO_4	K
			Particle size distribution in millimeters										
		Inches	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*		*ppm*	*ppm*
Amarillo fine sandy loam (Location: Approximately 800 ft. north and 150 ft. west of the SE corner of the NE ¼ sec. 4, T. 1 N., R. 37 E.)	A_p	0–5	0	0.3	1.3	28.7	40.9	71.2	14.9	13.9	Sandy loam	4.5	120
	B_1	5–16	0	.5	1.1	22.9	36.2	60.7	18.6	20.7	Sandy clay loam	1.0	60
	B_{21}	16–35	0	.6	1.5	22.6	25.9	50.6	19.8	29.6	Sandy clay loam	.5	75
	B_{2ca}	35–42	.2	1.0	1.8	26.2	28.1	57.3	19.1	23.6	Sandy clay loam	3.0	65
	C_{cam}	42–50	[1]	[1]	[1]	[1]	[1]	64.6	16.6	18.8	Sandy loam	[1]	[1]
	C_{ca1}	50–60	[1]	[1]	[1]	[1]	[1]	63.8	16.8	19.4	Sandy loam	[1]	[1]
	C_{ca2}	60–84	[1]	[1]	[1]	[1]	[1]	65.3	17.8	16.9	Sandy loam	[1]	[1]
	C	84–108	[1]	[1]	[1]	[1]	[1]	66.8	21.8	11.4	Sandy loam	[1]	[1]
Amarillo fine sandy loam (Location: ¼ mi. south and approximately 200 ft. east of the NW corner of sec. 9, T. 1 N., R. 37 E.)	A_p	0–6	0	.9	2.9	40.4	31.1	75.3	11.0	13.7	Sandy loam	2.0	95
	B_1	6–10	0	.9	2.8	36.2	25.5	65.4	13.2	21.4	Sandy clay loam	.5	80
	B_{21}	10–24	0	.6	1.9	27.3	25.5	55.3	18.9	25.8	Sandy clay loam	.5	70
	B_{22}	24–35	0	.7	2.2	32.0	28.4	63.3	13.6	23.1	Sandy clay loam	.5	65
	B_{23}	35–41/46	.1	.6	2.0	31.8	29.3	63.8	13.5	22.7	Sandy clay loam	.5	70
	C_{ca1}	41/46–60	[1]	[1]	[1]	[1]	[1]	61.8	18.2	20.0	Sandy clay loam	[1]	[1]
	C_{ca2}	60–81	[1]	[1]	[1]	[1]	[1]	56.6	22.7	20.7	Sandy clay loam	[1]	[1]
Clovis fine sandy loam (Location: Approximately 400 ft. south and 300 ft. east of the NW corner of sec. 10, T. 1 N., R. 37 E.)	Overblow	0–6	0	1.3	5.8	52.6	27.4	87.1	4.0	8.9	Loamy sand	1.0	65
	B_1	6–11	0	.8	3.1	37.4	27.5	68.8	11.0	20.2	Sandy clay loam	.5	45
	B_2	11–18/26	0	.8	2.8	34.1	26.4	64.1	13.4	22.5	Sandy clay loam	.5	45
	B_3	18/26–28/32	.2	1.2	2.6	29.5	26.8	60.3	14.6	25.1	Sandy clay loam	.5	45
	C_{ca1}	28/32–42	[1]	[1]	[1]	[1]	[1]	68.0	12.5	19.5	Sandy loam	[1]	[1]
	C_{ca2}	42–56	[1]	[1]	[1]	[1]	[1]	67.9	13.0	19.1	Sandy loam	[1]	[1]
	C	56–70	[1]	[1]	[1]	[1]	[1]	76.4	14.3	9.3	Sandy loam	[1]	[1]
Clovis fine sandy loam (Location: Approximately 250 ft. south and 100 ft. east of the SW corner of the NW ¼ sec. 3, T. 1 N., R. 37 E.)	A_p	0–8	.1	.6	1.8	34.4	35.5	72.4	13.1	14.5	Sandy loam	2.5	100
	B_2	8–17	0	.7	2.0	27.0	27.2	56.9	18.7	24.4	Sandy clay loam	.5	60
	B_3	17–27	1.3	1.3	2.0	24.7	23.8	53.1	20.7	26.2	Sandy clay loam	1.0	60
	C_{ca}	27/38–60	[1]	[1]	[1]	[1]	[1]	56.8	15.5	27.7	Sandy clay loam	[1]	[1]
	C	60–78	[1]	[1]	[1]	[1]	[1]	59.8	20.7	19.5	Sandy clay loam	[1]	[1]
Amarillo loam (Location: 1,100 ft. north and 100 ft. east of the SW corner of the NW ¼ sec. 27, T. 3 N., R. 37 E.)	A_p	0–6	0	.6	1.2	20.9	34.2	56.9	24.2	18.9	Sandy loam	3.5	100
	B_1	6–14	0	.6	1.0	18.6	30.3	50.5	22.3	27.2	Sandy clay loam	1.0	95
	B_2	14–21	0	.5	.8	13.8	21.6	36.7	27.6	35.7	Clay loam	.5	100
	B_{31}	21–37	.7	1.0	1.2	16.3	26.8	46.0	24.2	29.8	Sandy clay loam	.5	115
	B_{32}	37–42	.3	.8	1.1	18.3	31.0	51.5	22.0	26.5	Sandy clay loam	1.0	115
	C_{ca}	42–60	[1]	[1]	[1]	[1]	[1]	60.0	11.8	28.2	Sandy clay loam	[1]	[1]
	C	60–72	[1]	[1]	[1]	[1]	[1]	33.5	39.5	27.0	Loam	[1]	[1]
Pullman loam (Location: Approximately 400 ft. south and 300 ft. east of the NW corner of sec. 6, T. 4 N., R. 36 E.)	A_p	0–6	0	.5	1.3	12.3	26.2	40.3	34.1	25.6	Loam	2.0	110
	B_2	6–19	0	.4	.6	9.2	22.3	32.5	32.0	35.5	Clay loam	1.5	60
	B_{31}	19–30	.8	.6	.7	9.7	21.1	32.9	35.0	32.1	Clay loam	1.5	75
	B_{32}	30–52	1.0	.6	.7	9.8	23.4	35.5	31.2	33.3	Clay loam	2.5	100
	C_{ca}	52–72	[1]	[1]	[1]	[1]	[1]	54.5	24.6	20.9	Sandy clay loam	[1]	[1]
	C	72–90	[1]	[1]	[1]	[1]	[1]	49.1	29.7	21.2	Sandy clay loam	[1]	[1]
Pullman loam (Location: Approximately 1,440 ft. north and 660 ft. east of the SW corner of the SE ¼ sec. 1, T. 4 N., R. 36 E.)	A_{p1}	0–4	0	.6	.7	12.7	33.6	47.6	31.7	20.7	Loam	4.0	145
	B_{21}	4–6	0	.5	.7	11.1	31.4	43.7	30.2	26.1	Loam	2.0	105
	B_{22}	6–16	.1	.6	.7	9.7	24.4	35.5	30.9	33.6	Clay loam	.5	50
	B_{31}	16–32	.1	.5	.7	9.7	24.9	35.9	34.4	29.7	Clay loam	1.0	65
	C_1	32–50	.2	.4	.5	8.3	22.8	32.2	31.6	36.2	Clay loam	2.0	55
	C_{ca}	50–70	[1]	[1]	[1]	[1]	[1]	45.6	26.6	27.8	Sandy clay loam	[1]	[1]
	C	70–88	[1]	[1]	[1]	[1]	[1]	47.1	33.3	19.6	Loam	[1]	[1]
Pullman loam, thin solum (Location: Approximately ¼ mi. north and 200 ft. west of the center of sec. 22, T. 5 N., R. 35 E.)	A_p	0–6	0	.8	1.2	13.7	29.4	45.1	29.9	25.0	Loam	2.5	150
	B_2	6–17	.1	.8	1.0	11.4	25.3	38.6	28.7	32.7	Clay loam	1.0	60
	B_3	17–27/32	.3	.6	.9	12.5	27.1	41.4	29.5	29.1	Clay loam	1.5	45
	C_{ca1}	27/32–50	[1]	[1]	[1]	[1]	[1]	52.5	20.8	26.7	Sandy clay loam	[1]	[1]
	C_{ca2}	50–68	[1]	[1]	[1]	[1]	[1]	46.0	31.8	22.2	Loam	[1]	[1]
	C	68–90	[1]	[1]	[1]	[1]	[1]	42.7	41.4	15.9	Loam	[1]	[1]
Pullman loam, thin solum (Location: 100 ft. north and 150 ft. east of the SW corner of the NW ¼ sec. 14, T. 7 N., R. 35. E.)	A_p	0–4	.1	.4	1.5	14.8	32.7	49.5	29.5	21.0	Loam	3.0	140
	B_{21}	4–6	0	.2	.7	11.7	32.2	44.8	28.6	26.6	Loam	1.0	70
	B_{22}	6–11	.1	.2	.7	11.2	31.3	43.5	26.6	29.9	Clay loam	1.0	50
	B_3	11–15	.3	.4	.7	9.5	27.2	38.1	27.0	34.9	Clay loam	1.0	50
	C_{ca}	15–39	[1]	[1]	[1]	[1]	[1]	41.4	37.0	21.6	Loam	[1]	[1]
	C_1	39–57	[1]	[1]	[1]	[1]	[1]	41.4	34.5	24.4	Loam	[1]	[1]
	C_2	57–75	[1]	[1]	[1]	[1]	[1]	41.5	35.7	22.8	Loam	[1]	[1]
	C	75–90	[1]	[1]	[1]	[1]	[1]	42.5	35.2	22.3	Loam	[1]	[1]

[1] Not analyzed.

Glossary

Aggregate (of soil). A mass or cluster of many soil particles held together, such as a granule, clod, block, or prism.

Alluvium (alluvial deposits). Soil materials deposited on land by streams.

Blowout. An area of soil from which most, or all, of the fine soil material has been removed by wind. Such an area appears as a shallow depression with a flat or irregular floor consisting of a resistant layer or accumulation of pebbles, or the water table may be at the surface. The soil is usually barren. Blowouts are common near dunes.

Calcareous soil. Soil that contains enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) when treated with dilute hydrochloric acid. Soil that is alkaline in reaction because of the presence of free calcium carbonate.

Caliche. A broad term for more or less strongly cemented deposits of calcium carbonate in many soils of warm-temperate areas. When near the surface or exposed by erosion, the material hardens.

Chisel. A tillage machine that has one or more soil-penetrating points that can be drawn through the soil to loosen or shatter the subsoil to a depth of 12 to 18 inches.

Clay. (1) As a soil separate, the mineral soil particles less than 0.002 mm. in diameter. (2) As a soil textural class, soil material that contains 40 percent or more clay, as defined under (1), and less than 45 percent sand and less than 40 percent silt.

Clay skin. A dark-colored film of fine clay that coats the surfaces and pores of soil aggregates, or peds, in many strongly developed soils; occurs predominantly in the B horizon and consists of clay leached from horizons above.

Climax vegetation. The final stage of plant succession for a given natural environment; the stage at which the composition of the plant community remains unchanged and can reproduce itself as long as the environment remains unchanged.

Colluvium (colluvial deposits). Mixed deposits of rock fragments and coarse soil materials near the bases of steep slopes. The deposits have accumulated as the result of soil creep, slides, or local wash.

Complex, soil. An association in which two or more soils are so intricately intermixed that it is not practical to show them separately at the scale of mapping used.

Consistence, soil. The nature of soil material that is expressed by the resistance of the individual particles to separating from one another (cohesion) or by the ability of a soil mass to undergo a change in shape without breaking (plasticity). The consistence varies with the moisture content. Thus a soil aggregate or clod may be hard when dry and plastic when wet. Terms used to describe consistence are—

Friable. When moist, easily crushed by hand and coheres when pressed together. Friable soils are easily tilled.

Firm. When moist, crushes under moderate pressure, but resistance is distinctly noticeable. Firm soils are likely to be difficult to till.

Hard. When dry, is moderately resistant to pressure; can be broken in the hands without difficulty but is barely breakable between thumb and forefinger.

Indurated. Hard, very strongly cemented; brittle; does not soften under prolonged wetting.

Loose. Noncoherent when moist or dry. Loose soils are generally coarse textured and are easily tilled.

Plastic. When wet, retains an impressed shape and resists being deformed; plastic soils are high in clay and are difficult to till.

Soft. Weakly coherent and fragile; when dry, breaks to powder or individual grains under slight pressure.

Contour furrows. Furrows plowed at right angles to the direction of the slope, at the same level throughout, and at regular intervals.

Cretaceous. A period of geologic time that occurred between 60 and 130 million years ago. Also, geologic materials deposited during the Cretaceous period.

Deep plowing. A tillage practice, generally used as a protective measure against wind erosion, whereby the finer textured subsoil materials are turned up and mixed with the sandy surface soil. In Curry County the soil is usually broken to depths of 12 to 20 inches under this method.

Dendritic. Branching, like a shrub or tree; usually said of river systems, various plants, and of the veins of leaves of many higher plants.

Deflation. The formation of a depression through the removal of loose soil materials by high winds.

Drawdown. The inverted cone-shaped area of water depletion, below the level of the static water table, that occurs temporarily after an irrigation well has been pumped for a considerable time.

Dryland farming. Generally, producing crops that require at least some tillage, without irrigation, in subhumid to semiarid areas. Commonly the system involves using periods of fallow between crops, during which water from precipitation is absorbed and retained. The fallow period is usually 1 or 2 years for each year of cropping.

Eolian deposits. Wind-deposited materials moved fairly short distances and accumulated in dunes; generally coarse textured.

Field capacity. The amount of moisture that the soil will hold 2 or 3 days following a heavy rain or after irrigation.

Great soil group. Any one of several broad groups of soils with fundamental characteristics in common.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, with characteristics produced by soil-forming processes. The relative positions of the several soil horizons in the soil profile and their nomenclature are given below:

Horizon A. The master horizon consisting of (1) one or more mineral horizons of maximum organic accumulation; or (2) surface or subsurface horizons that are lighter in color than the underlying horizon and which have lost clay minerals, iron, and aluminum with resultant concentration of the more resistant minerals; or (3) horizons belonging to both of these categories.

Horizon B. The master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, with accessory organic material; or (2) blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A horizons or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly, the lower limit of the B horizon corresponds to the lower limit of the solum.

Horizon C. A layer of unconsolidated material, relatively little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a part of the overlying solum has developed.

Horizon D. Any stratum underlying the C, or the B if no C is present, which is unlike the C, or unlike the material from which the solum has been formed.

Listing. A type of tillage in which the plowshares throw the soil in opposite directions and leave the field with alternate ridges and furrows. This type of tillage is used on the High Plains to form a roughened surface for protection against wind erosion.

Loess. Geological deposit of fairly uniform fine material, mostly silt, presumably transported by the wind.

Ogallala formation. The water-bearing geologic formation that underlies the High Plains, extending to a depth of several hundred feet. It is comprised of alluvial outwash of the Pliocene epoch.

Parent material. The unconsolidated material from which the soil develops.

Ped. An individual natural soil aggregate such as a crumb, a prism, or a block, in contrast to a *clod*, which is a mass of soil brought about by digging or other disturbance.

Permeability, soil. That quality of the soil that enables it to transmit air and water. Moderately permeable soils transmit air and water readily. Such conditions are favorable for root growth. Slowly permeable soils allow water and air to move so slowly that root growth may be restricted. Rapidly permeable soils transmit air and water rapidly. Root growth is good.

Permian. A period of geologic time that occurred between 185 and 210 million years ago; refers to geologic materials deposited during the Permian period.

Phase, soil. A subdivision of the soil type covering variations that are chiefly in such external characteristics as relief, stoniness, or accelerated erosion.

Physiography. The study of the development of the natural features of the land surface; physical geography.

Playa. A flat-bottomed, undrained basin that contains shallow water for short periods following rains.

Pleistocene. A geologic epoch that occurred between 25 thousand and a million years ago; refers to geologic material deposited during this time.

Pliocene. A geologic epoch that occurred between 1 million and 12 million years ago; refers to geologic materials deposited during that time.

Plow layer. That part of the soil profile in which tillage takes place.

Profile, soil. A vertical section of the soil through all of its horizons and extending into the parent material. (*See* **Horizon, soil**).

Range site. Kinds of range land that differ from each other in their ability to produce a significantly different kind or amount of climax or original vegetation. A significant difference means one large enough to require different grazing use or management to maintain or improve the resource.

Readily available moisture. The amount of moisture in the soil that plants can obtain from the soil while maintaining rapid growth.

Relief. Elevations or inequalities of the land surface, considered collectively.

Runoff. Surface drainage of rain or melted snow.

Sand. (1) Individual rock or mineral fragments having diameters ranging from 0.05 mm. (0.002 in.) to 2.0 mm. (0.079 in.). Sand grains consist chiefly of quartz, but they may be any mineral composition. (2) The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils that have genetic horizons similar, except for the texture of the surface soil, as to differentiating characteristics and arrangement in the soil profile, and developed from a particular type of parent material. A series may include two or more soil types that differ from one another in the texture of the surface soil.

Silt. (1) Individual mineral particles of soil that range in diameter from the upper size of clay, 0.002 mm., to the lower size of very fine sand, 0.05 mm. (2) Soil of the textural class called silt contains 80 percent or more silt and less than 12 percent clay.

Soil association. A group of soils, with or without characteristics in common, that occur in a regular geographical pattern.

Solum. The part of the soil profile, above the unweathered parent material, in which the processes of soil formation are active. In mature soils the solum includes the A and B horizons.

Structure. The arrangement of individual soil particles into aggregates with definite shape or pattern. Structure is described in terms of *class*, *grade*, and *type*.

Class. Refers to the size of the soil aggregates.

Grade. Distinctness and durability of the aggregates. Grade is expressed as *weak*, *moderate*, or *strong*. Soil that has no visible structure is termed massive if coherent, or single grain if noncoherent.

Type. Shape and arrangement of the aggregates. *Granular*, *blocky*, and *prismatic* types of structure predominate in soils of Curry County.

Stubble-mulch tillage. A type of tillage used in areas subject to wind erosion; subtillage sweeps loosen the subsoil and eradicate weeds but leave the crop stubble more or less undisturbed.

Subsurface tillage. Tillage with a sweeplike plow or blade that does not turn over the surface cover or incorporate it into the lower soil.

Terrace (for control of runoff or soil erosion or both). An embankment or ridge constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surplus runoff to retard it for infiltration into the soil so that any excess may flow slowly to a prepared outlet without harm.

Texture, soil. The relative proportions of sand, silt, and clay particles in the soil. (*See* **Sand; Clay; Silt**).

Coarse-textured soil. Contains a large proportion of sand, is loose and noncoherent when dry, and is generally relatively low in fertility and moisture-holding capacity; highly erodible.

Moderately coarse textured soil. High sand content but has enough silt and clay to form fragile clods; individual sand grains easily seen, and soil mass feels gritty; highly erodible.

Medium-textured soil. About equal proportions of sand, silt, and clay; generally friable but forms stable clods.

Moderately fine textured soil. Contains large amount of clay; generally absorbs water slowly and is more difficult to cultivate than coarse-textured soil.

Fine-textured soil. Contains large proportion of clay; normally hard when dry and plastic when wet.

Tillage pan. A dense, highly compact zone occurring in the soil just below normal tillage depth; caused by tilling when the soil is moist and compact.

Tilth, soil. The ease with which a soil can be tilled; the physical condition of a soil in respect to its fitness for the growth of a specified plant or sequence of plants.

Topography. The physical land features, collectively, of an area.

Type, soil. A group of soils having genetic horizons similar as to differentiating characteristics, including texture and arrangement of the soil profile, and developed from a particular kind of parent material.

Wind sorting. The removal of clay and fine silt particles from the soil by strong winds; coarser textured particles are left, so the soil becomes sandier and highly erodible.

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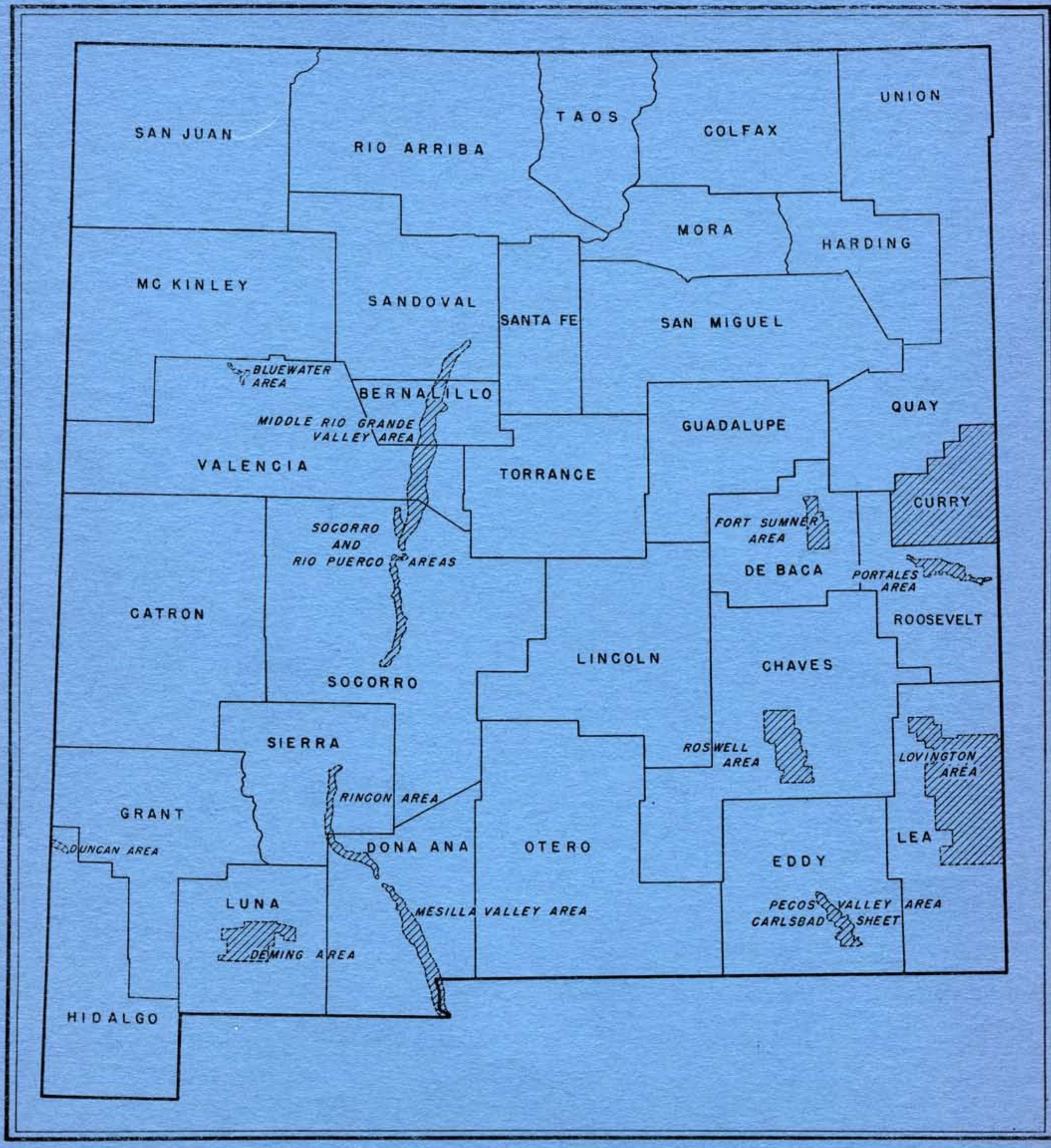

Areas surveyed in New Mexico shown by shading.

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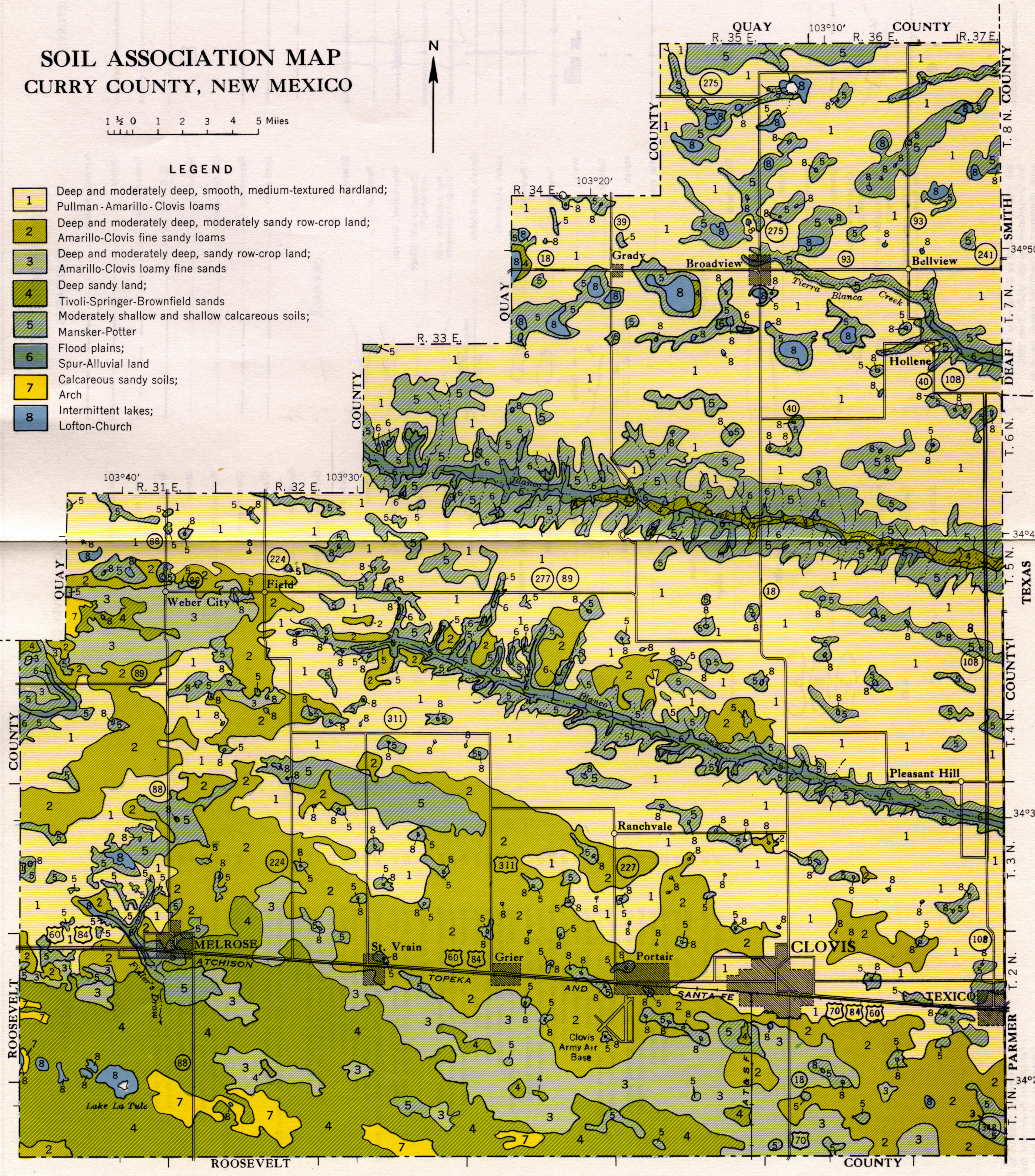
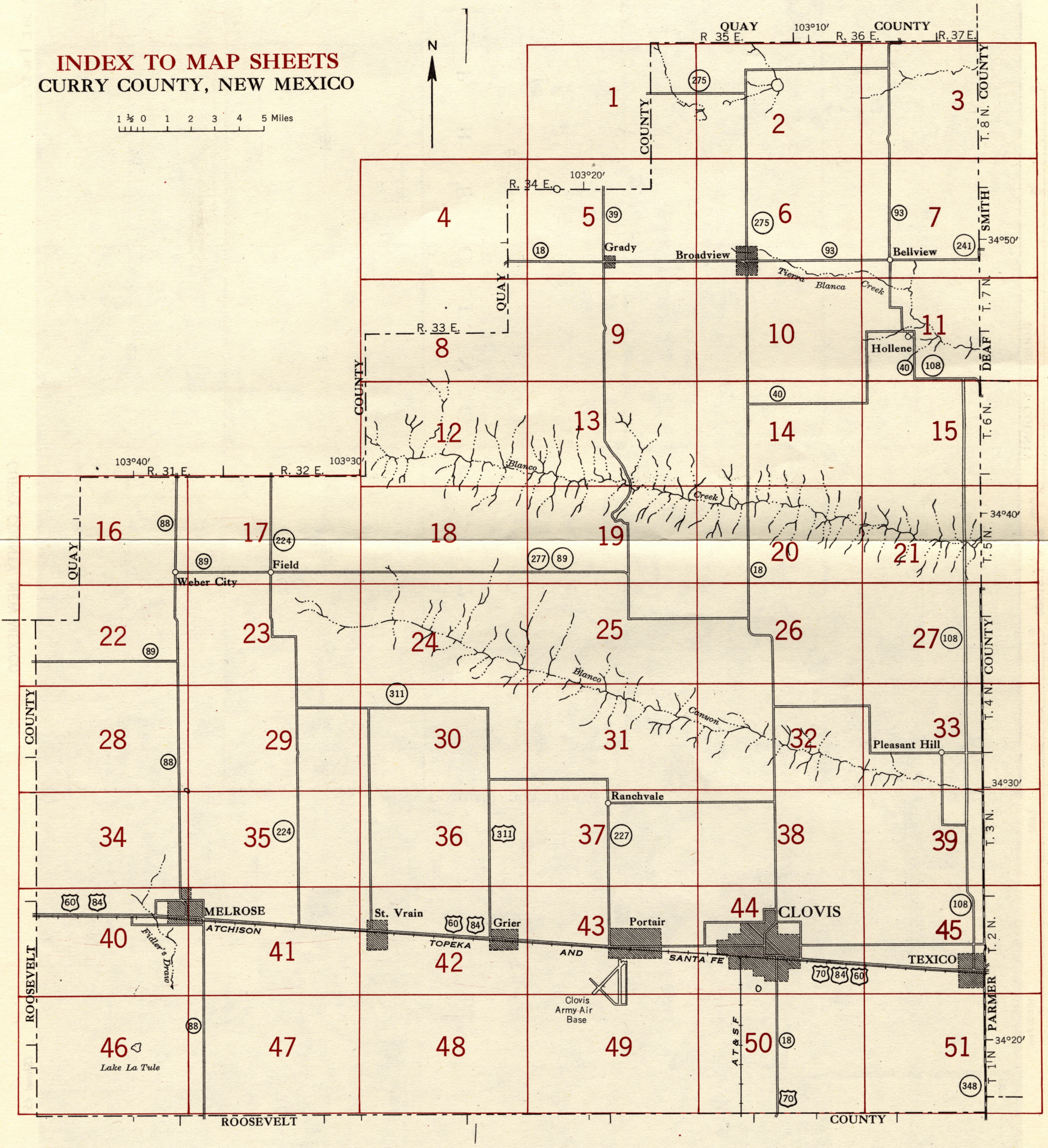
SOIL ASSOCIATION MAP
CURRY COUNTY, NEW MEXICO



INDEX TO MAP SHEETS
CURRY COUNTY, NEW MEXICO



CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Roads
- Good motor
- Poor motor
- Trail
- Marker, U. S. (33)

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry
- Ford
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church
- Station

Mine and Quarry
- Shaft
- Dump
- Prospect

Pits, gravel or other

Power line, substation

Pipeline

Cemetery

Dam

Levee

Tank

Oil well

Windmill

Canal lock (point upstream)

BOUNDARIES

- National or state
- County
- Township, civil
- U. S.
- Section
- City (corporate)
- Reservation
- Land grant

DRAINAGE

Streams
- Perennial
- Intermittent, unclass.
  - Crossable with tillage implements
  - Not crossable with tillage implements

Canals and ditches (CANAL, DITCH)

Lakes and ponds
- Perennial
- Intermittent

Wells (flowing)

Springs

Marsh

Wet spot

RELIEF

Escarpments
- Bedrock
- Other

Prominent peaks

Depressions (Large, Small)
- Crossable with tillage implements
- Not crossable with tillage implements
- Contains water most of the time

SOIL SURVEY DATA

Soil type outline and symbol (Dx)

Gravel

Stones

Rock outcrops

Chert fragments

Clay spot

Sand spot

Gumbo or scabby spot

Made land

Erosion
- Uneroded spot (U)
- Sheet, moderate (S)
- Sheet, severe (SS)
- Gully, moderate (G)
- Gully, severe (GG)
- Sheet and gully, moderate (SG)
- Wind, moderate
- Wind, severe
- Blowout
- Wind hummock
- Overblown soil

Gullies
- Crossable with tillage implements
- Not crossable with tillage implements

Areas of alkali and salts
- Strong (A)
- Moderate (M)
- Slight (S)
- Free of toxic effect (F)
- Sample location (26)
- Saline spot

SOILS LEGEND

	NAME
Aa	Alluvial land
Ab	Amarillo fine sandy loam, 0-2 percent slopes
Ac	Amarillo fine sandy loam, 2-5 percent slopes
Ad	Amarillo loam, 0-2 percent slopes
Ae	Amarillo loam, 2-5 percent slopes
Ag	Amarillo loamy fine sand, 0-2 percent slopes
Ah	Amarillo loamy fine sand, 2-5 percent slopes
Ak	Amarillo loamy fine sand, 0-3 percent slopes, wind eroded
Am	Arch fine sandy loam
An	Arch loamy fine sand
Ba	Brownfield fine sand, 0-2 percent slopes
Bb	Brownfield fine sand, 0-2 percent slopes, wind eroded
Ca	Church clay loam
Cb	Clovis fine sandy loam, 0-2 percent slopes
Cc	Clovis fine sandy loam, 2-5 percent slopes
Cd	Clovis loam, 0-2 percent slopes
Ce	Clovis loam, 2-5 percent slopes
Cg	Clovis loamy fine sand, 0-2 percent slopes
Ch	Clovis loamy fine sand, 2-5 percent slopes
Ck	Clovis loamy fine sand, 0-2 percent slopes, wind eroded
Da	Drake fine sandy loam, 2-10 percent slopes
Db	Drake loamy fine sand, 2-10 percent slopes
La	Lofton clay loam
Ma	Mansker fine sandy loam, 0-2 percent slopes
Mb	Mansker fine sandy loam, 2-5 percent slopes
Mc	Mansker fine sandy loam, 5-10 percent slopes
Md	Mansker loam, 0-2 percent slopes
Me	Mansker loam, 2-5 percent slopes
Mg	Mansker loam, 5-10 percent slopes
Mh	Mansker loamy fine sand, 0-2 percent slopes
Pa	Potter fine sandy loam, 0-5 percent slopes
Pb	Potter fine sandy loam, 5-20 percent slopes
Pc	Potter loam, 0-5 percent slopes
Pd	Potter loam, 5-20 percent slopes
Pe	Pullman loam, 0-2 percent slopes
Pg	Pullman loam, 2-5 percent slopes
Ph	Pullman loam, thin solum, 0-2 percent slopes
Pk	Pullman loam, thin solum, 2-5 percent slopes
Sa	Springer loamy fine sand, 0-2 percent slopes
Sb	Springer loamy fine sand, 2-5 percent slopes
Sc	Stony rough land, mixed materials
Sd	Stony rough land, Potter materials
Se	Spur clay loam
Sg	Spur loam
Ta	Tivoli fine sand
Tb	Tivoli-Arch-Potter complex

Soil map constructed by Cartographic Division, Soil Conservation Service, USDA, from 1950 aerial photographs. Controlled mosaic based on polyconic projection, 1927 North American datum.

Soils surveyed 1952-55 by Donald E. Buchanan, New Mexico Agricultural Experiment Station, and W. James Ross, U. S. Department of Agriculture.
Correlation by W. G. Harper, U. S. Department of Agriculture.

CURRY COUNTY, NEW MEXICO

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

1

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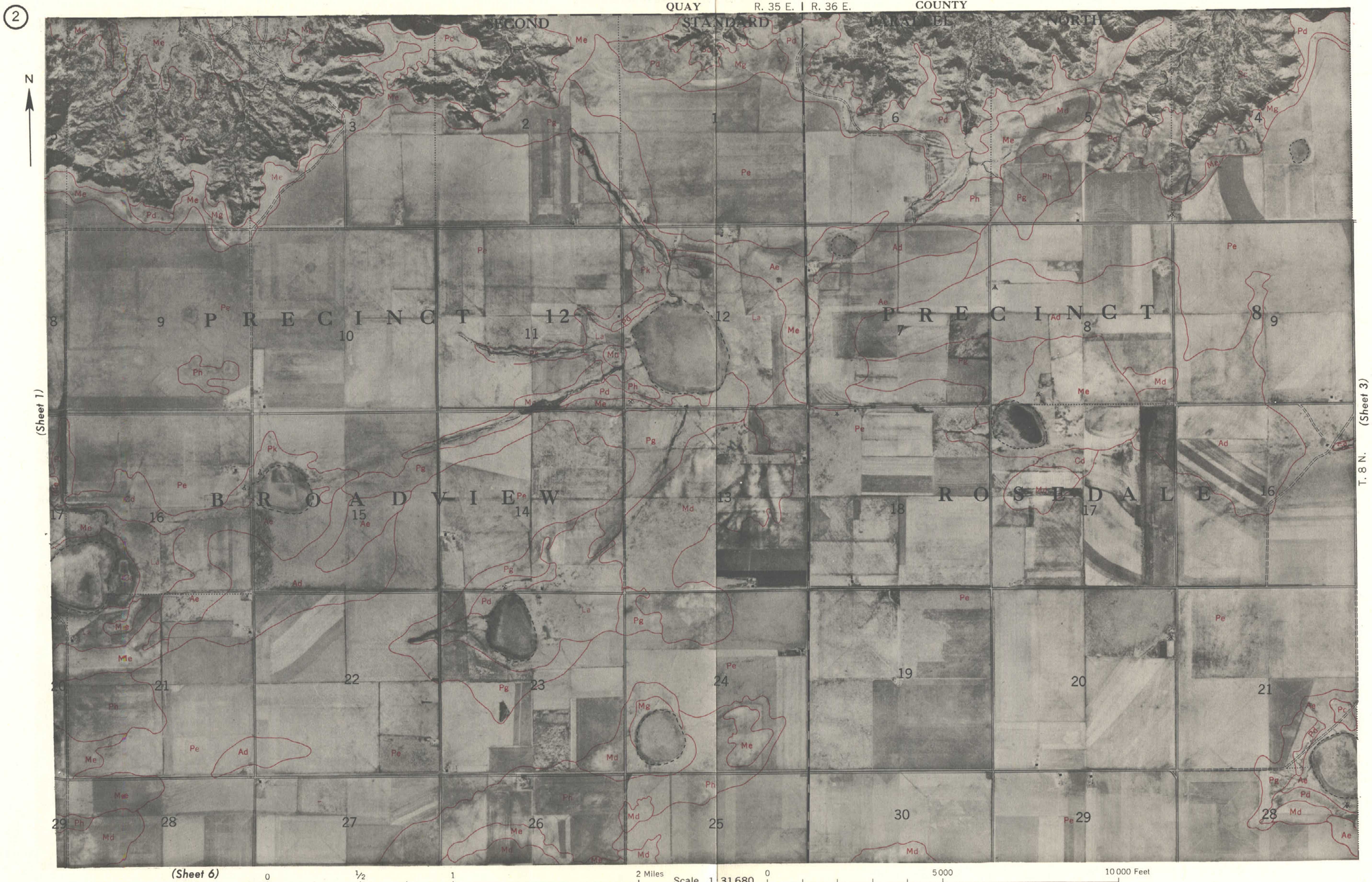
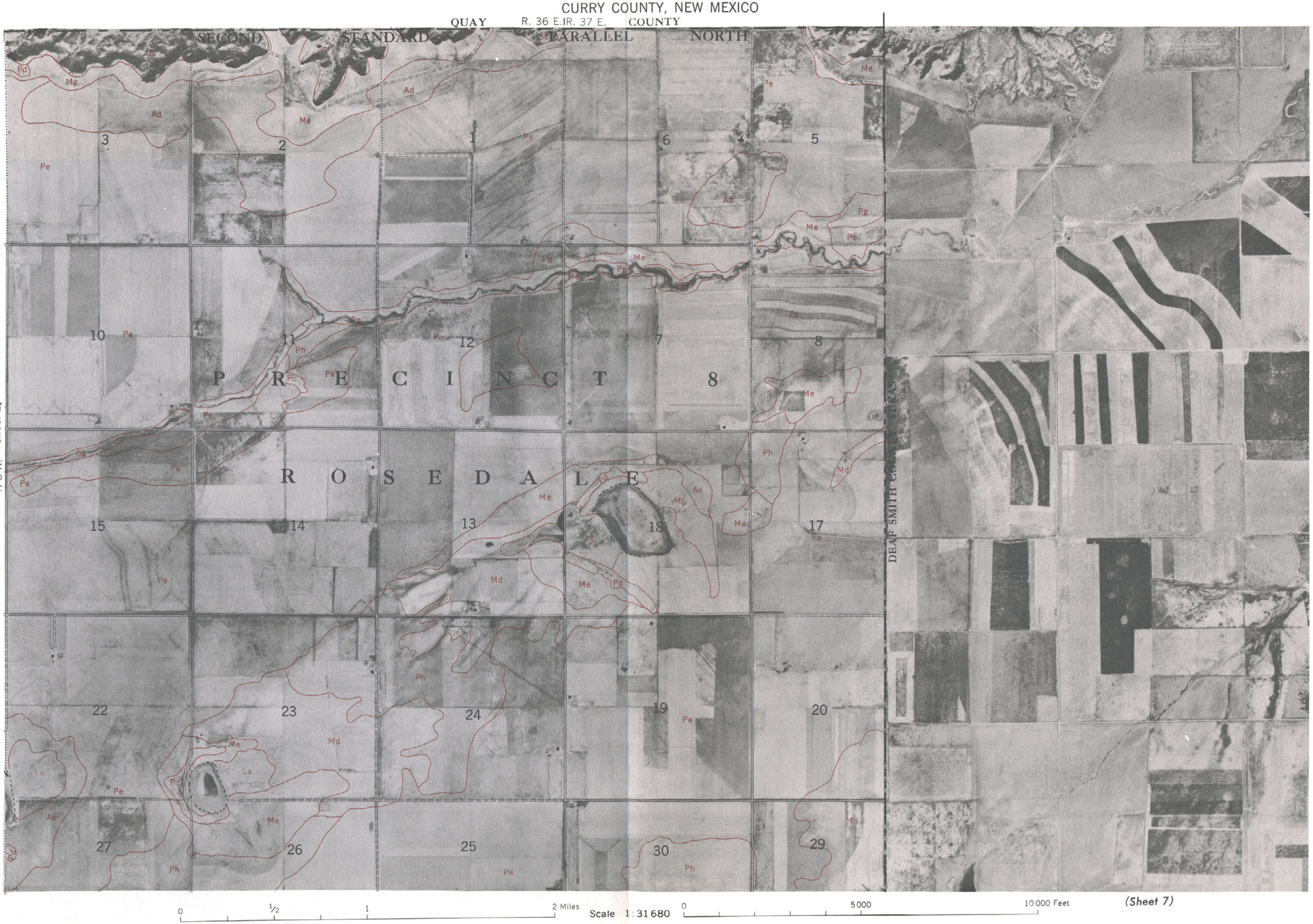
CURRY COUNTY, NEW MEXICO



CURRY COUNTY, NEW MEXICO



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4

N

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

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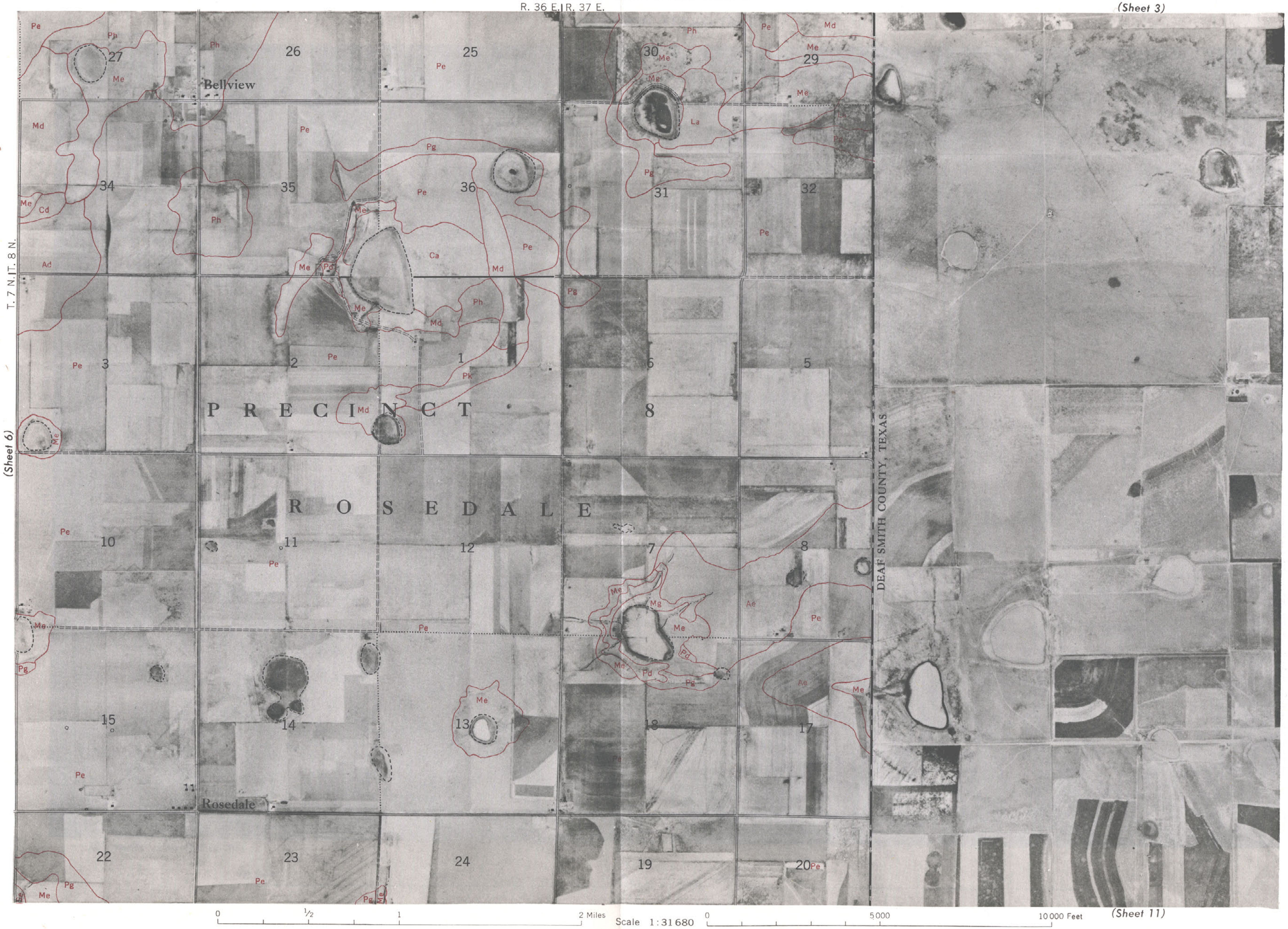
(Sheet 2)
R. 35 E. | R. 36 E.
N
T. 7 N. | T. 8 N.
(Sheet 5)
(Sheet 7)
(Sheet 10)
PRECINCT 12
BROADVIEW
PRECINCT 8
ROSEDALE
PRECINCT 7 GRADY
Broadview
28
27
26
25
30
29
33
34
35
36
31
32
4
3
2
1
6
5
9
10
11
12
7
8
16
15
14
13
18
17
21
22
23
24
19
20
Pe
Ph
Md
Me
Mg
La
Ae
Ad
Pd
Cd
Ce
Pk
Ca
Da
Pc
Pg
Se
Mg
Scale 1:31 680
0
1/2
1
2 Miles
0
5000
10 000 Feet

CURRY COUNTY, NEW MEXICO



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8

(Sheet 4)

R. 33 E. R. 34 E. (Sheet 12)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

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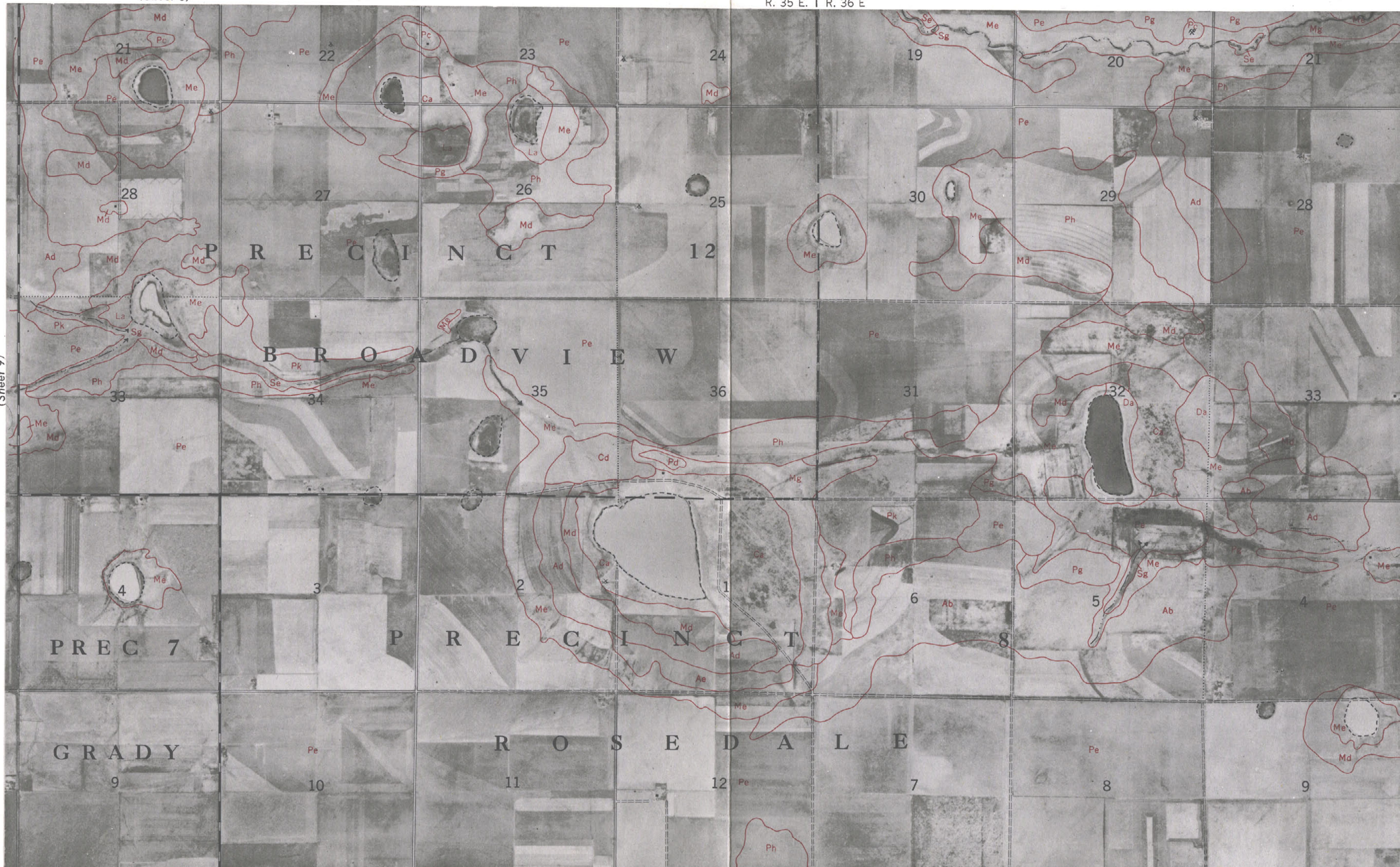
10

CURRY COUNTY, NEW MEXICO



Scale 1:31 680

0 ½ 1 2 Miles

0 5000 10 000 Feet

R. 36 E. | R. 37 E.

(Sheet 10)

T. 6 N. | T. 7 N.

(Sheet 15)

Scale 1:31680

0 ½ 1 2 Miles

0 5000 10 000 Feet

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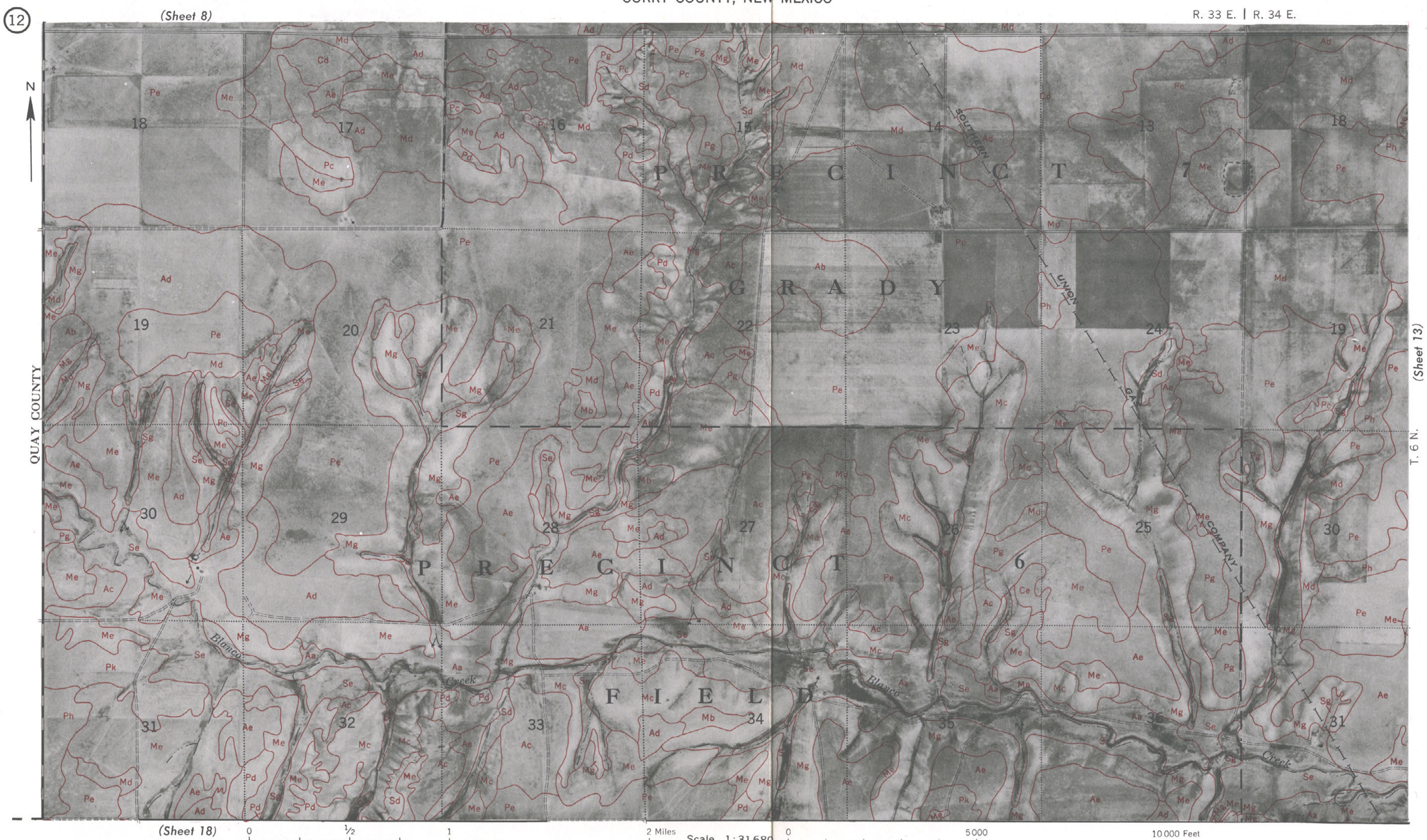
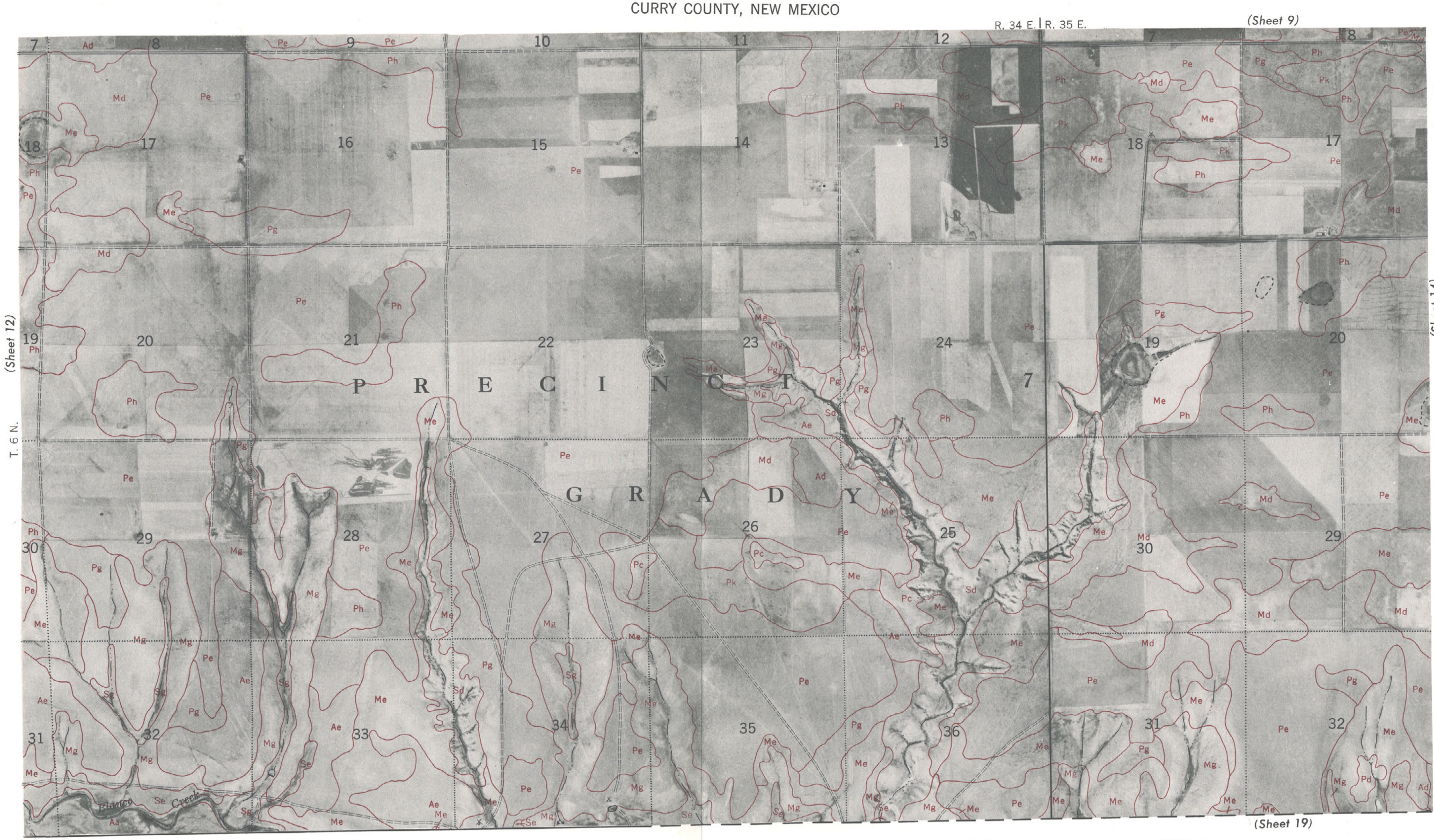

12
(Sheet 8)
R. 33 E. | R. 34 E.
N
QUAY COUNTY
(Sheet 13)
T. 6 N.
(Sheet 18)
GRADY PRECINCT
FIELD PRECINCT
PRECINCT
SOUTHERN UNION GAS COMPANY
Blanco Creek
0 1/2 1 2 Miles
Scale 1:31 680
0 5000 10 000 Feet



0 1/2 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

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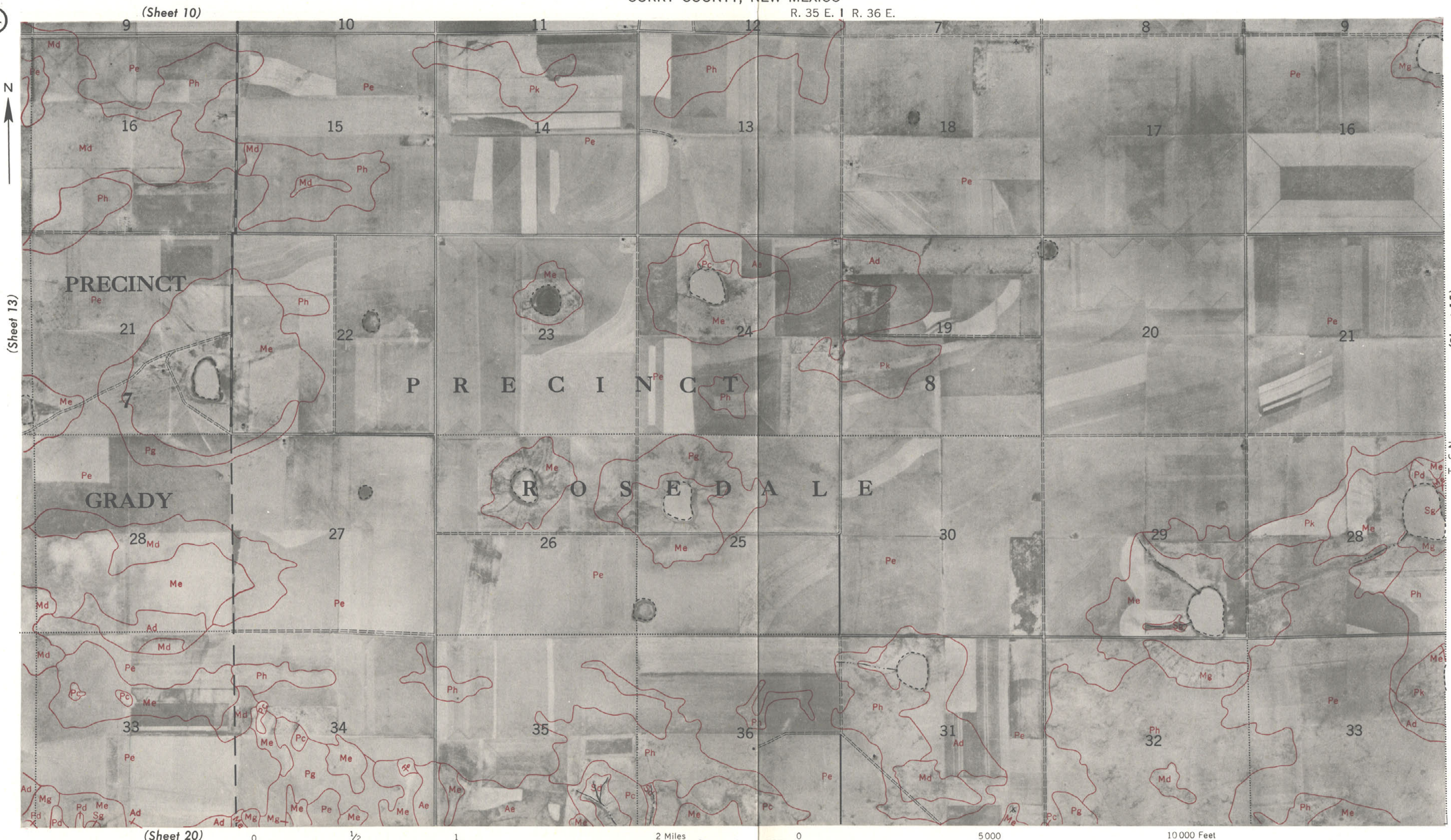
(14)

CURRY COUNTY, NEW MEXICO



(Sheet 20) 0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

CURRY COUNTY, NEW MEXICO

(Sheet 11)

R. 36 E. | R. 37 E.

(Sheet 14)

T. 6 N.

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

(Sheet 21)

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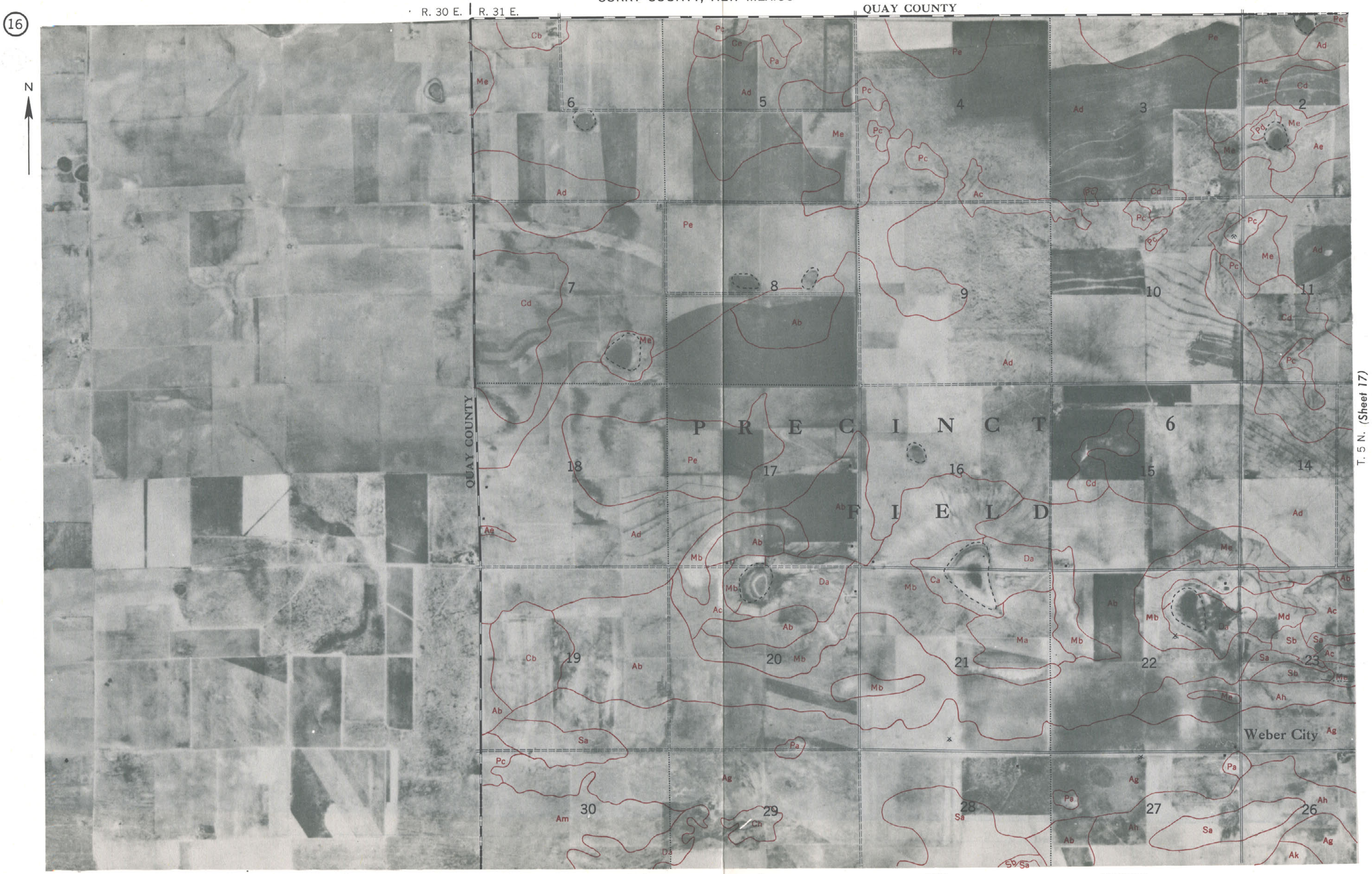
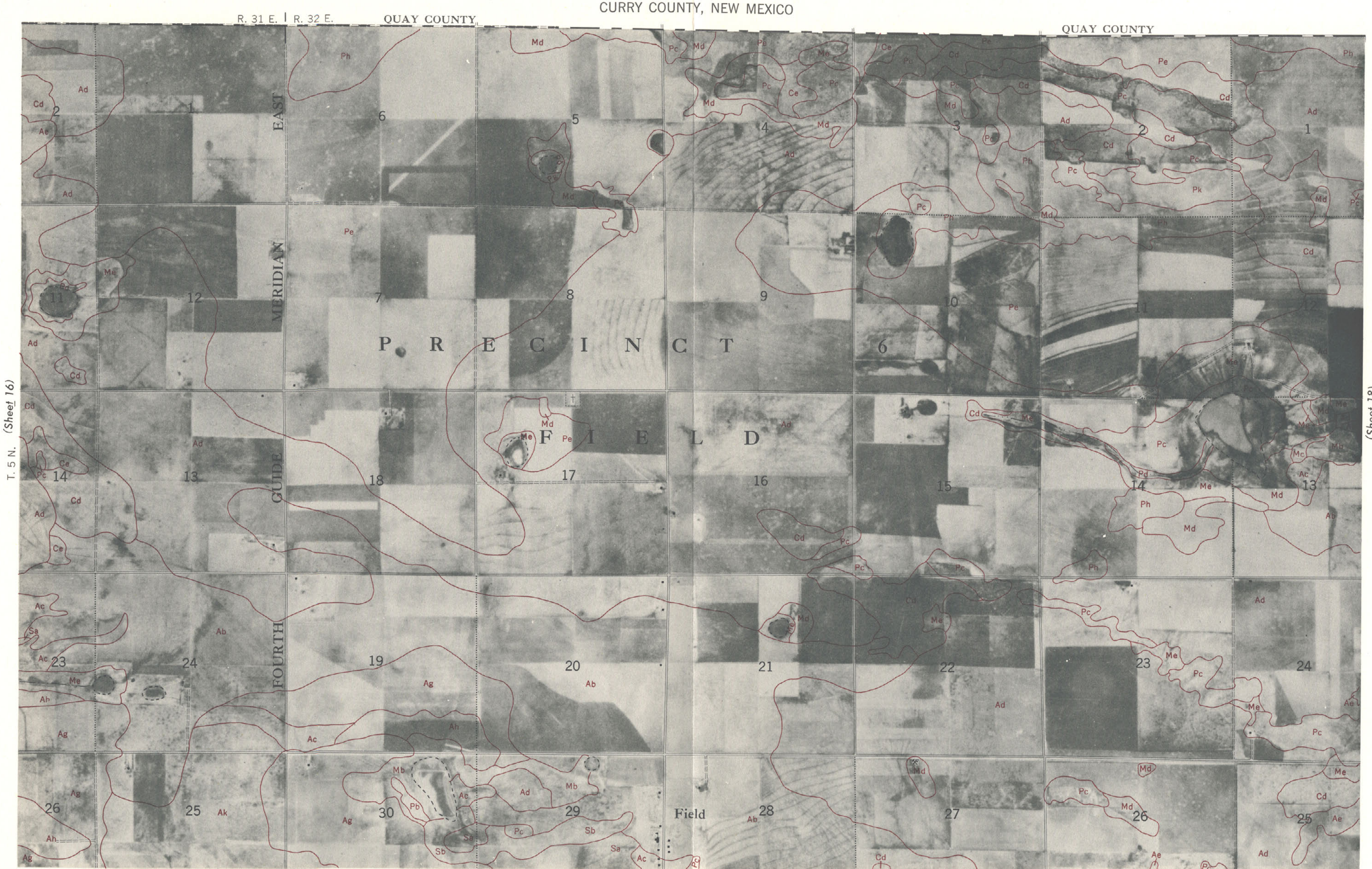
16

CURRY COUNTY, NEW MEXICO



(Sheet 22) 0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

CURRY COUNTY, NEW MEXICO



0 ½ 1 2 Miles Scale 1:31680 0 5000 10000 Feet

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(18)

R. 32 E. | R. 33 E. (Sheet 12) R. 33 E. | R. 34 E.

(Sheet 17)

(Sheet 19) T. 5 N.

(Sheet 24)

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

0 ½ 1 2 Miles Scale 1:31680 0 5000 10000 Feet

(Sheet 25)

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CURRY COUNTY, NEW MEXICO

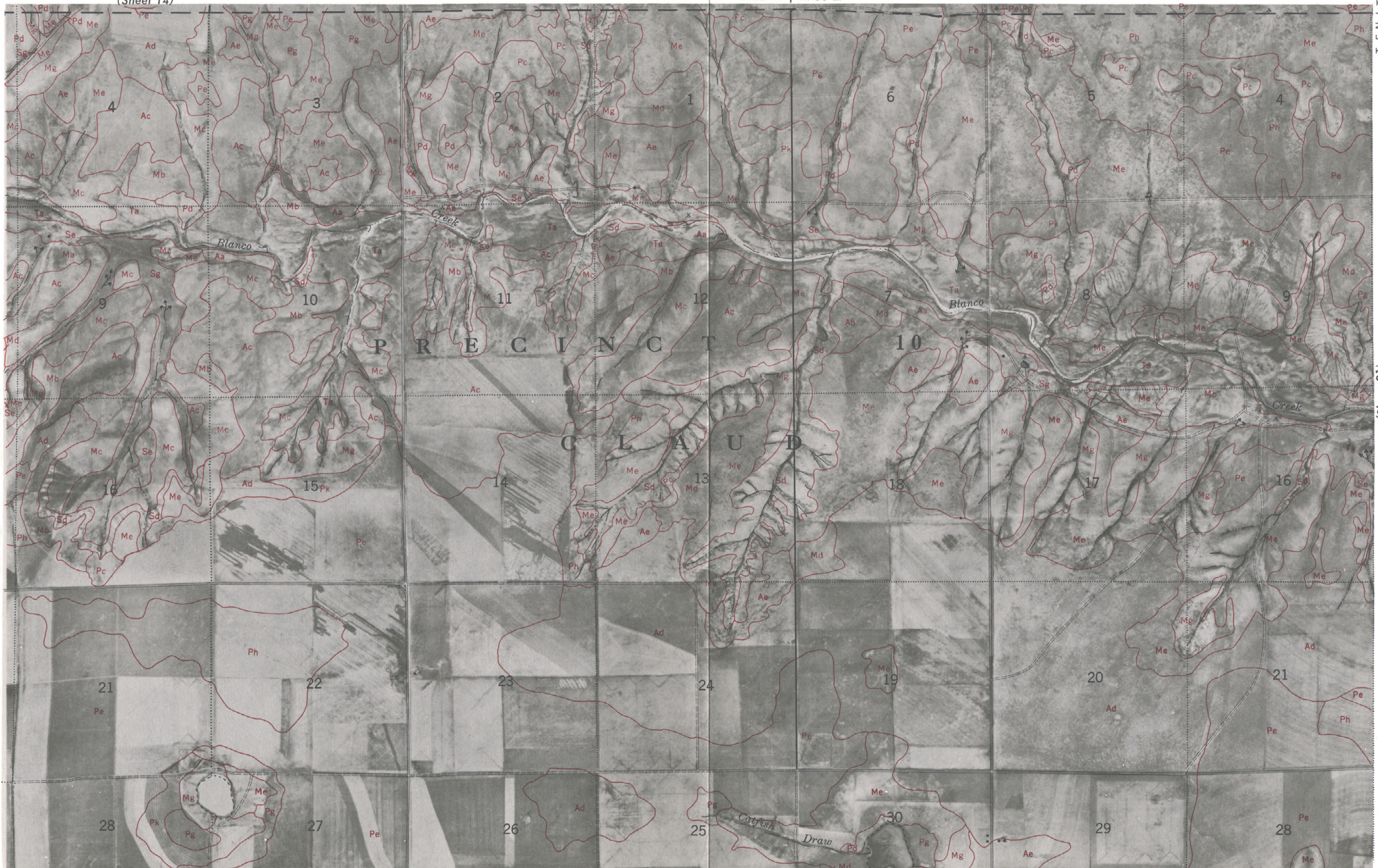
R. 35 E. | R. 36 E.

T. 5 N. | T. 6 N.

(Sheet 14)

N

(Sheet 19)



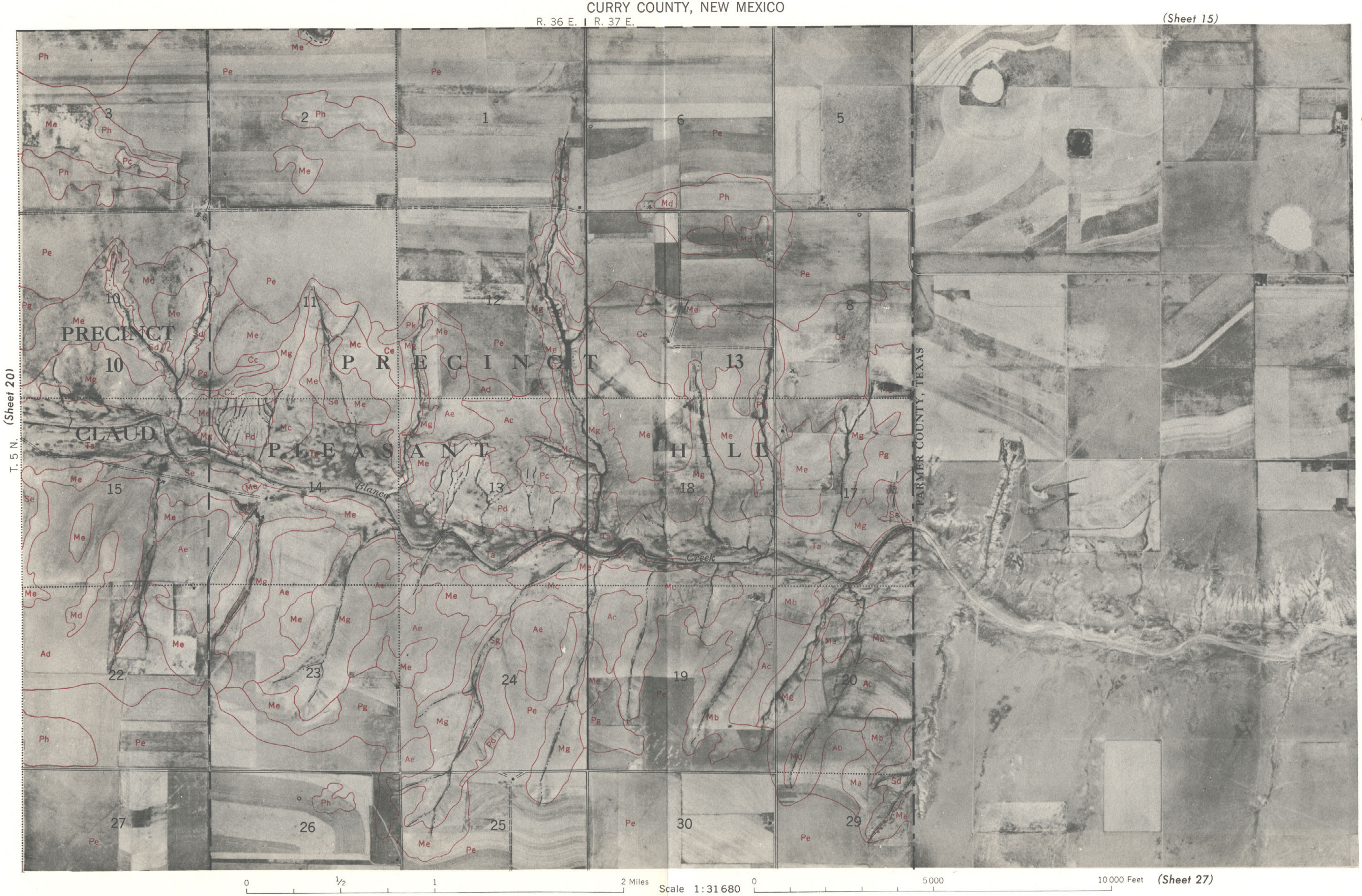
(Sheet 21)

(Sheet 26)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet



This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1937 and 1951


(Sheet 16)
R. 31 E.
N
QUAY COUNTY
ROOSEVELT COUNTY
FIRST STANDARD PARALLEL NORTH
PRECINCT 6
FIELD
PRECINCT 5B
MELROSE
FOURTH GUIDE MERIDIAN EAST
T. 5 N.
T. 4 N.
(Sheet 23)
(Sheet 28)
R. 31 E.
R. 32 E.
30
29
28
27
26
31
32
33
34
35
6
5
4
3
2
1
7
8
9
10
11
12
18
17
16
15
14
13
0
1/2
1
2 Miles
Scale 1:31 680
0
5000
10 000 Feet

R. 31 E. | R. 32 E.

(Sheet 17)

T. 4 N. | T. 5 N.

(Sheet 22)

(Sheet 24)

0 1/2 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

R. 32 E. | R. 33 E.

(Sheet 29)

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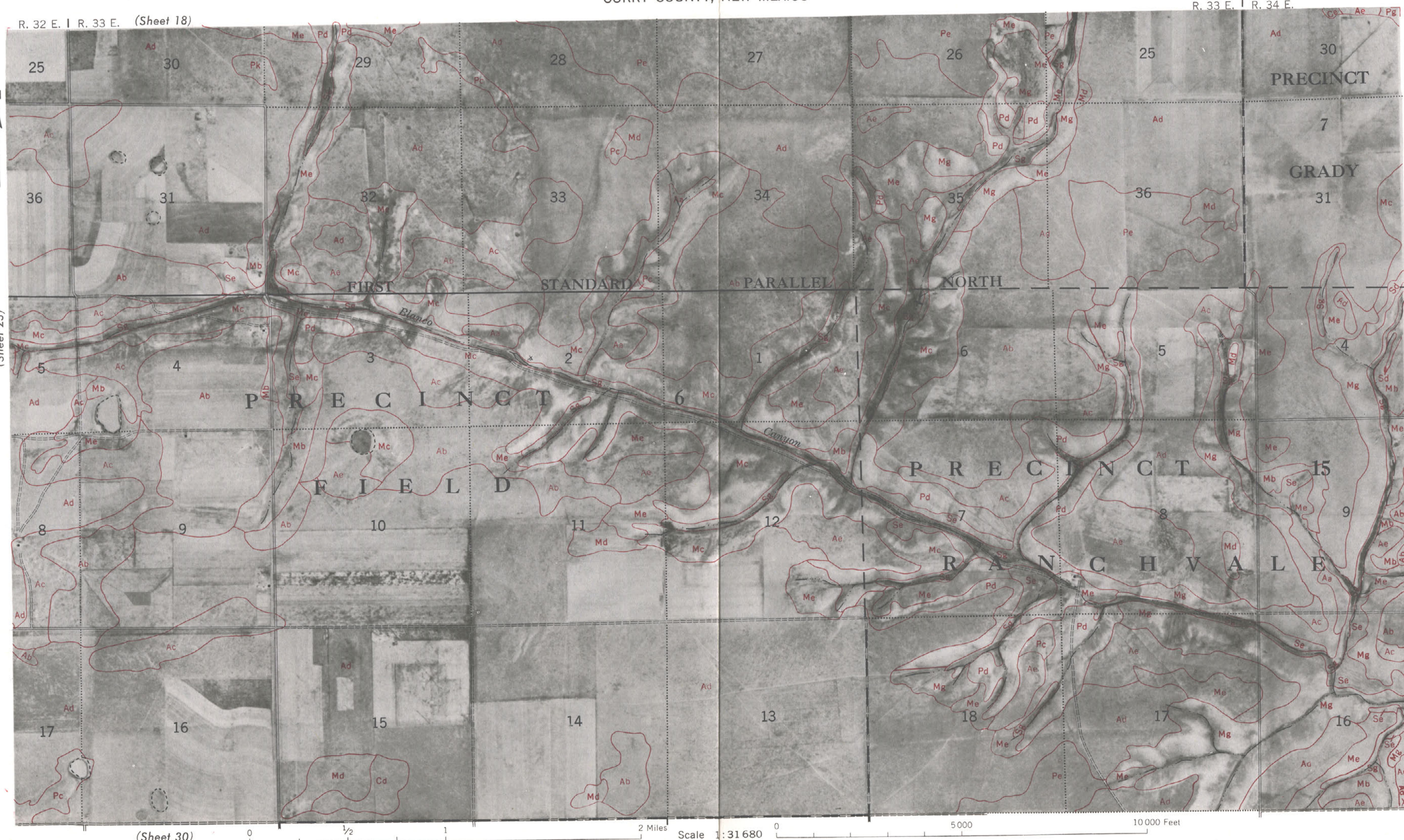
CURRY COUNTY, NEW MEXICO

(24)



(Sheet 19)

R. 34 E. | R. 35 E.

25

R. 34 E. | R. 35 E.

(Sheet 31)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

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CURRY COUNTY, NEW MEXICO

(Sheet 20)

R. 35 E. | R. 36 E.

(Sheet 25)

T. 4 N. | T. 5 N.

(Sheet 27)

(Sheet 32)

0 ½ R. 35 E. | R. 36 E. 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

CURRY COUNTY, NEW MEXICO

R. 36 E. | R. 37 E. (Sheet 21)

R. 36 E. | R. 37 E. (Sheet 33)

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

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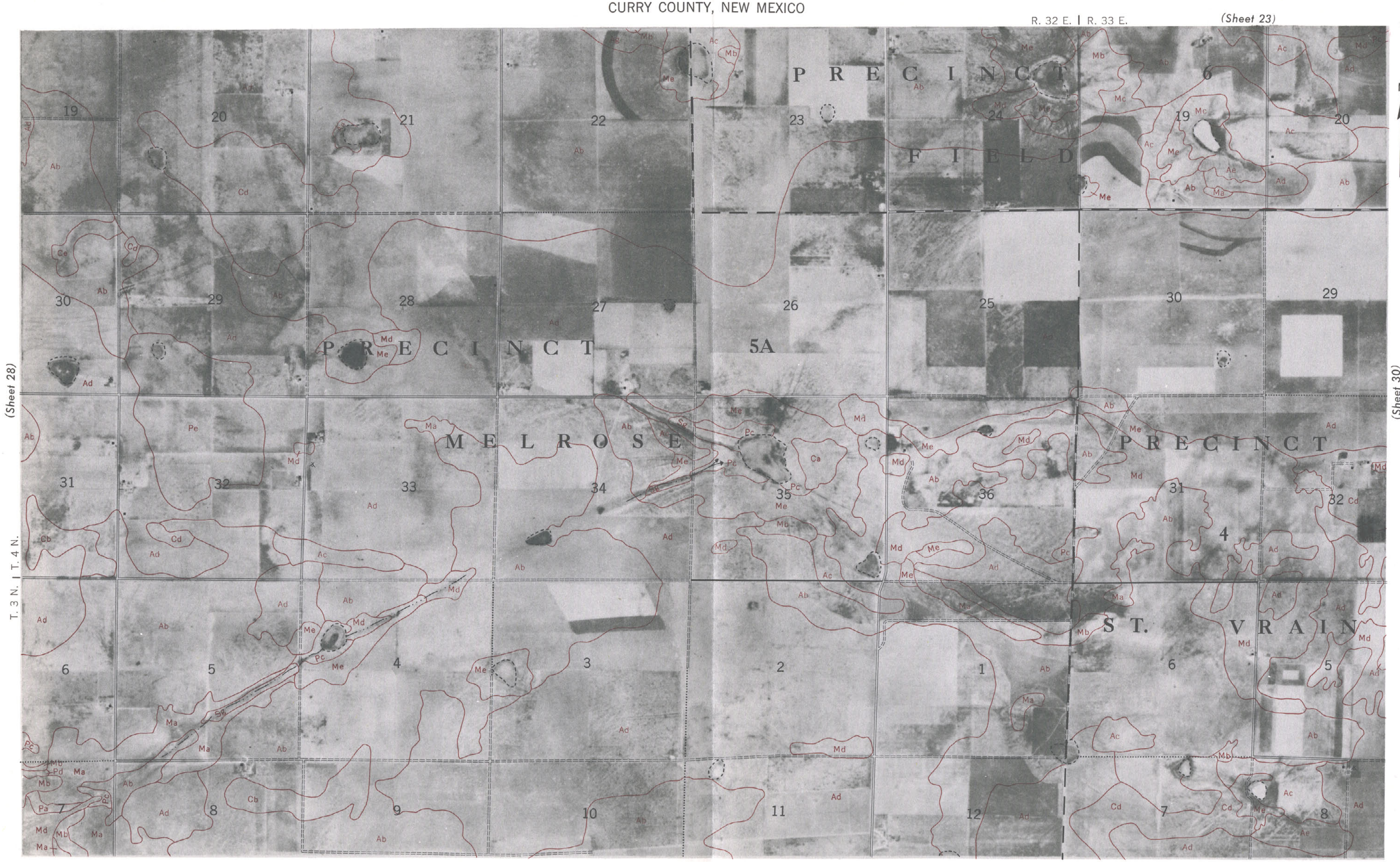
(28) R. 31 E. (Sheet 22) R. 31 E. R. 32 E.

(Sheet 29) T. 4 N. T. 3 N.

(Sheet 34)

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet



0 1/2 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

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(Sheet 24)
R. 33 E. | R. 34 E.
N
PRECINCT 6
FIELD
PRECINCT 4
ST. VRAIN
PRECINCT
GRIER
PRECINCT
RANCHVALE
(Sheet 29)
(Sheet 31)
T. 3 N. | T. 4 N.
(Sheet 36)
0
½
1
2 Miles
Scale 1 : 31 680
0
5000
10 000 Feet

CURRY COUNTY, NEW MEXICO

R. 34 E. | R. 35 E.

(Sheet 25)

(Sheet 30)

T. 3 N. | T. 4 N.

(Sheet 32)

0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

(Sheet 37)

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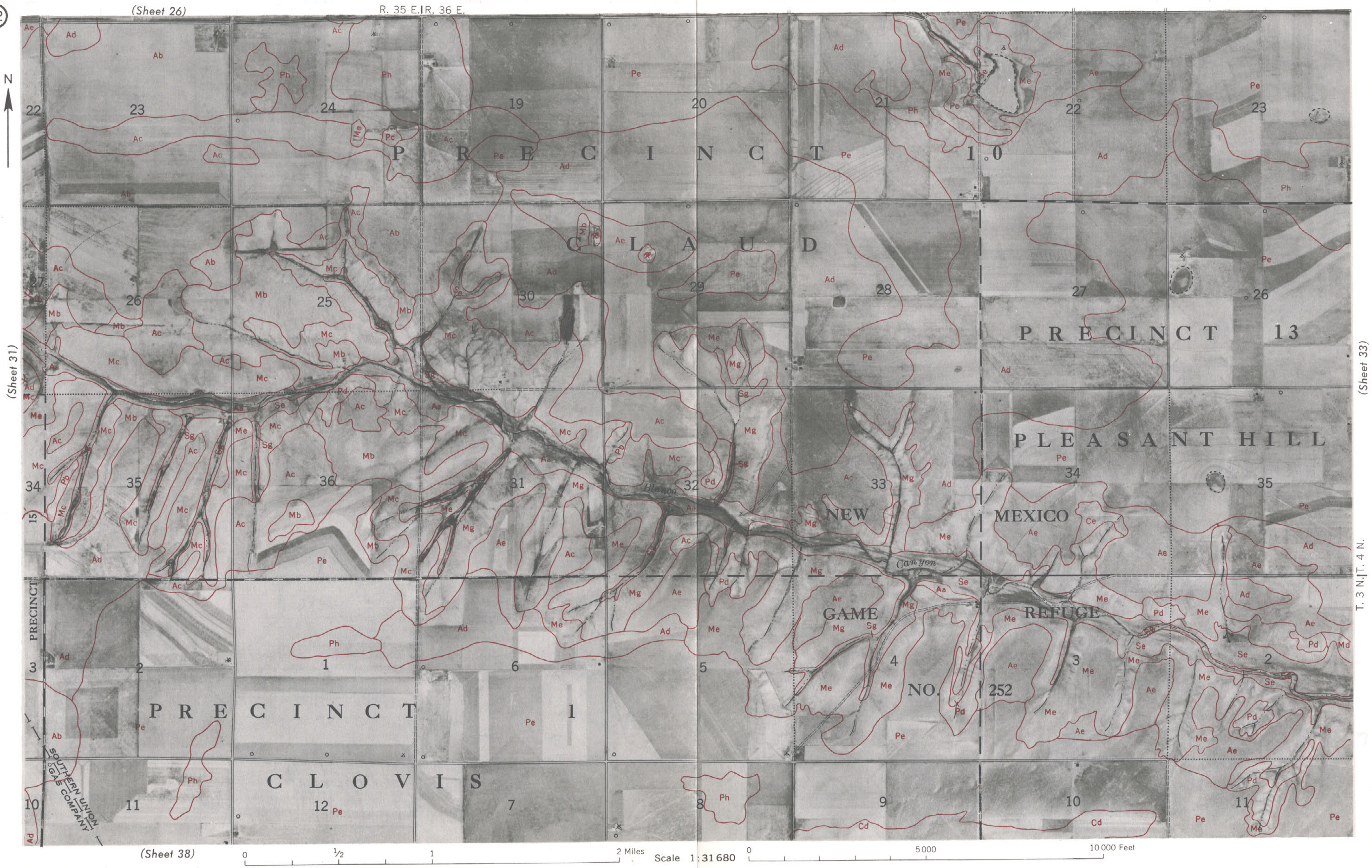
CURRY COUNTY, NEW MEXICO



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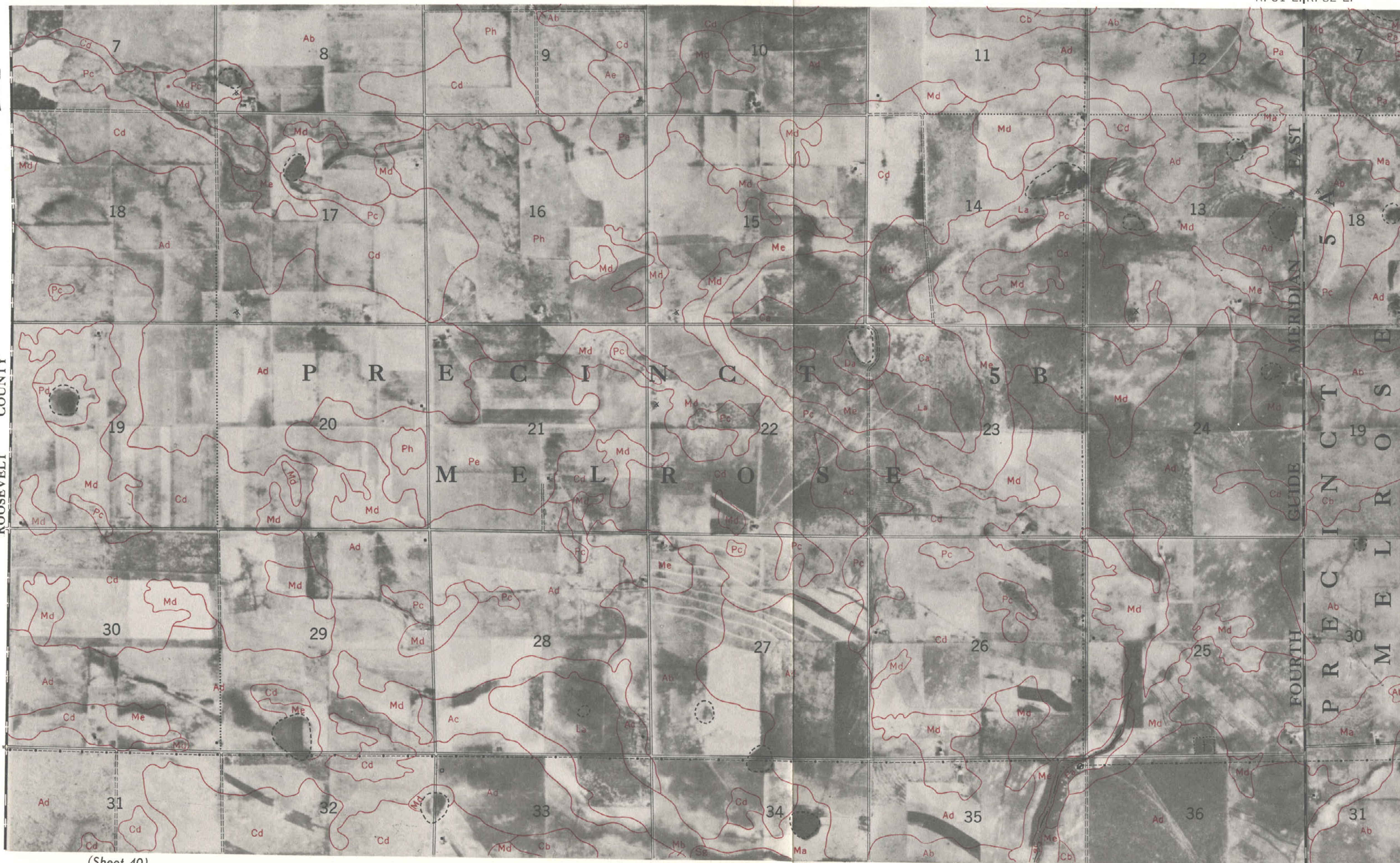
CURRY COUNTY, NEW MEXICO

(Sheet 28)

R. 31 E. | R. 32 E.



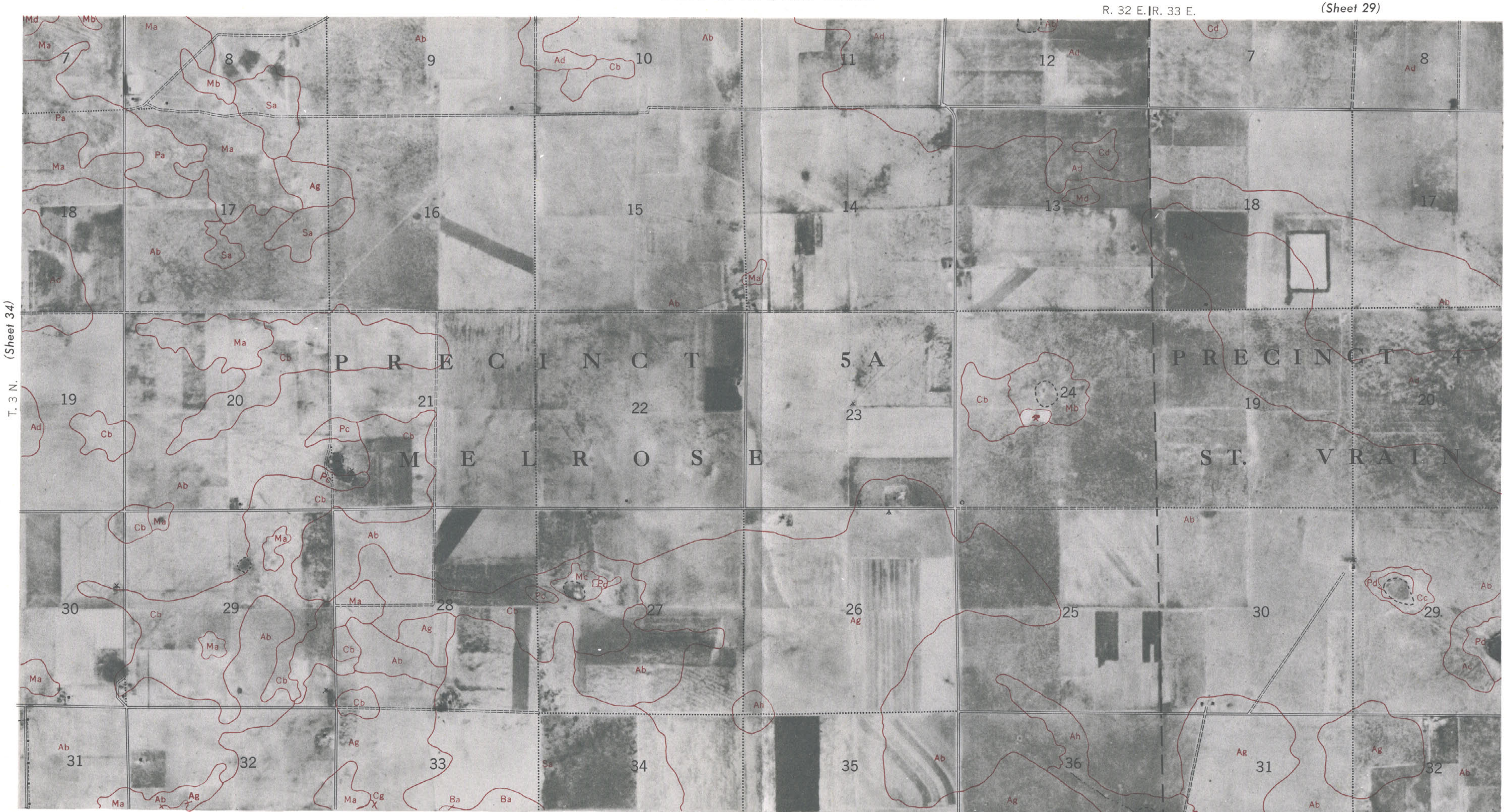
(Sheet 40)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

CURRY COUNTY, NEW MEXICO



0 ½ 1 2 Miles Scale 1:31 680 0 5000 10 000 Feet

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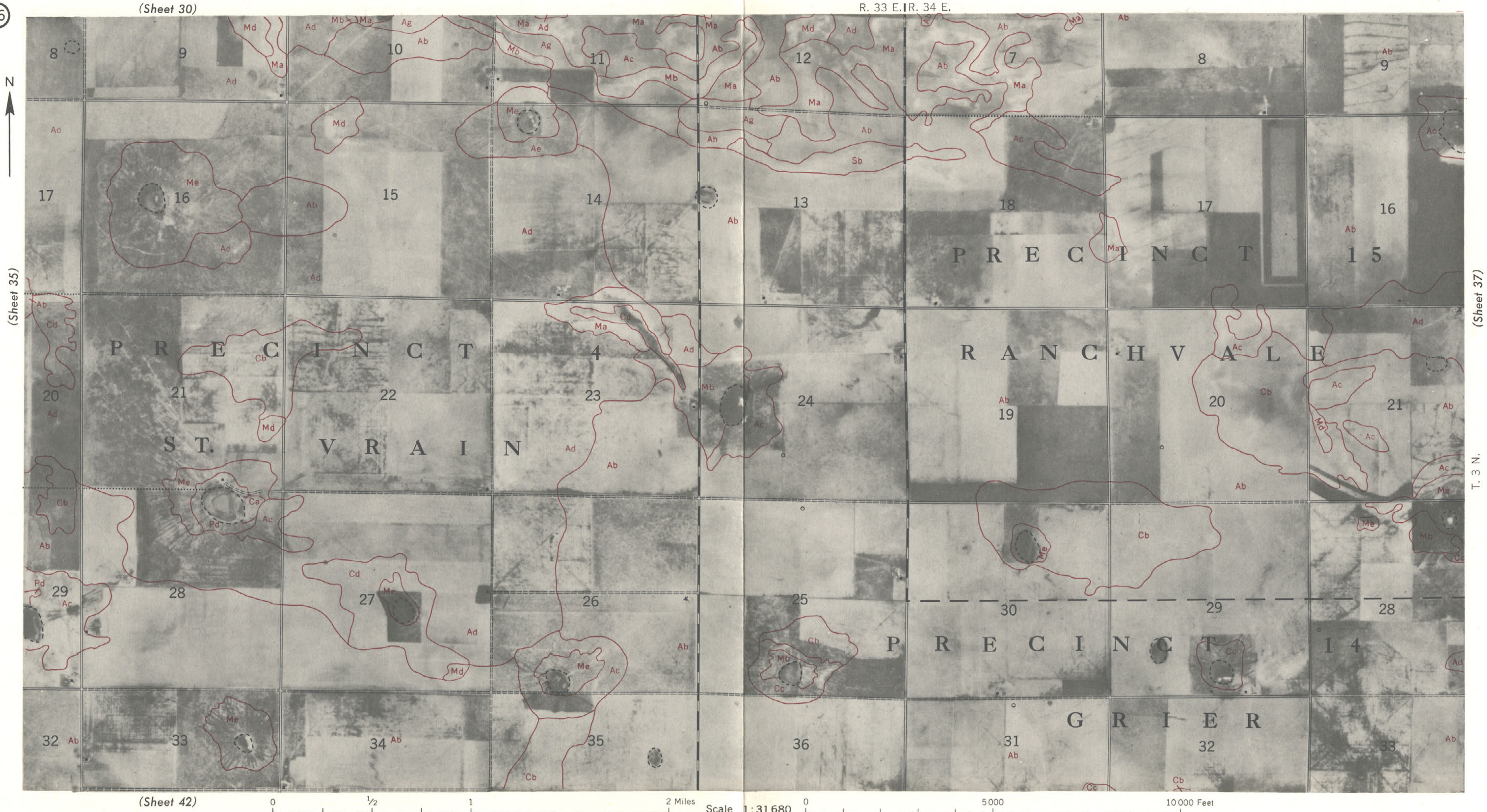
36

CURRY COUNTY, NEW MEXICO



CURRY COUNTY, NEW MEXICO

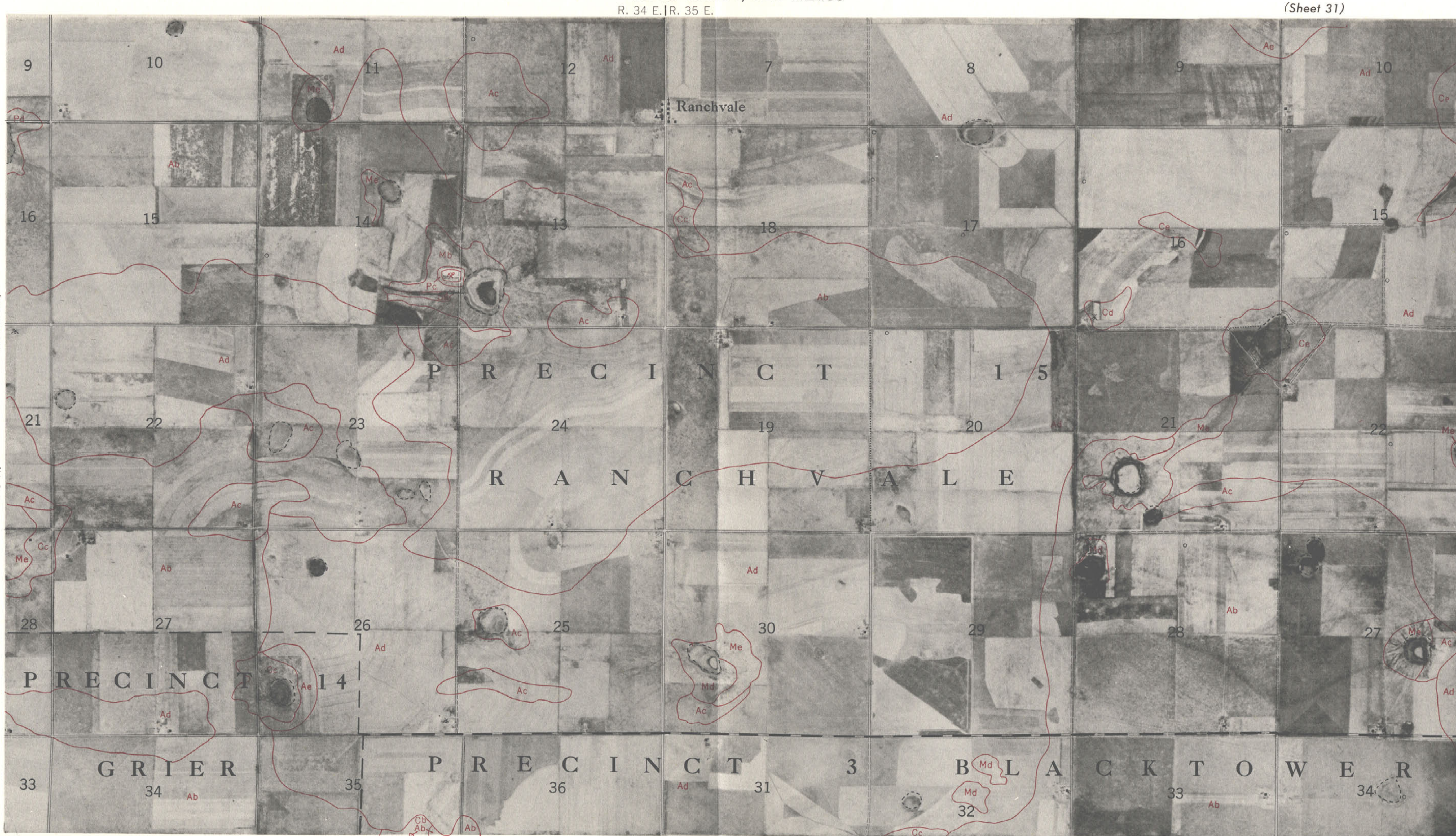
R. 34 E. | R. 35 E.

(Sheet 31)

37

(Sheet 36)

T. 3 N.



(Sheet 38)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

(Sheet 43)

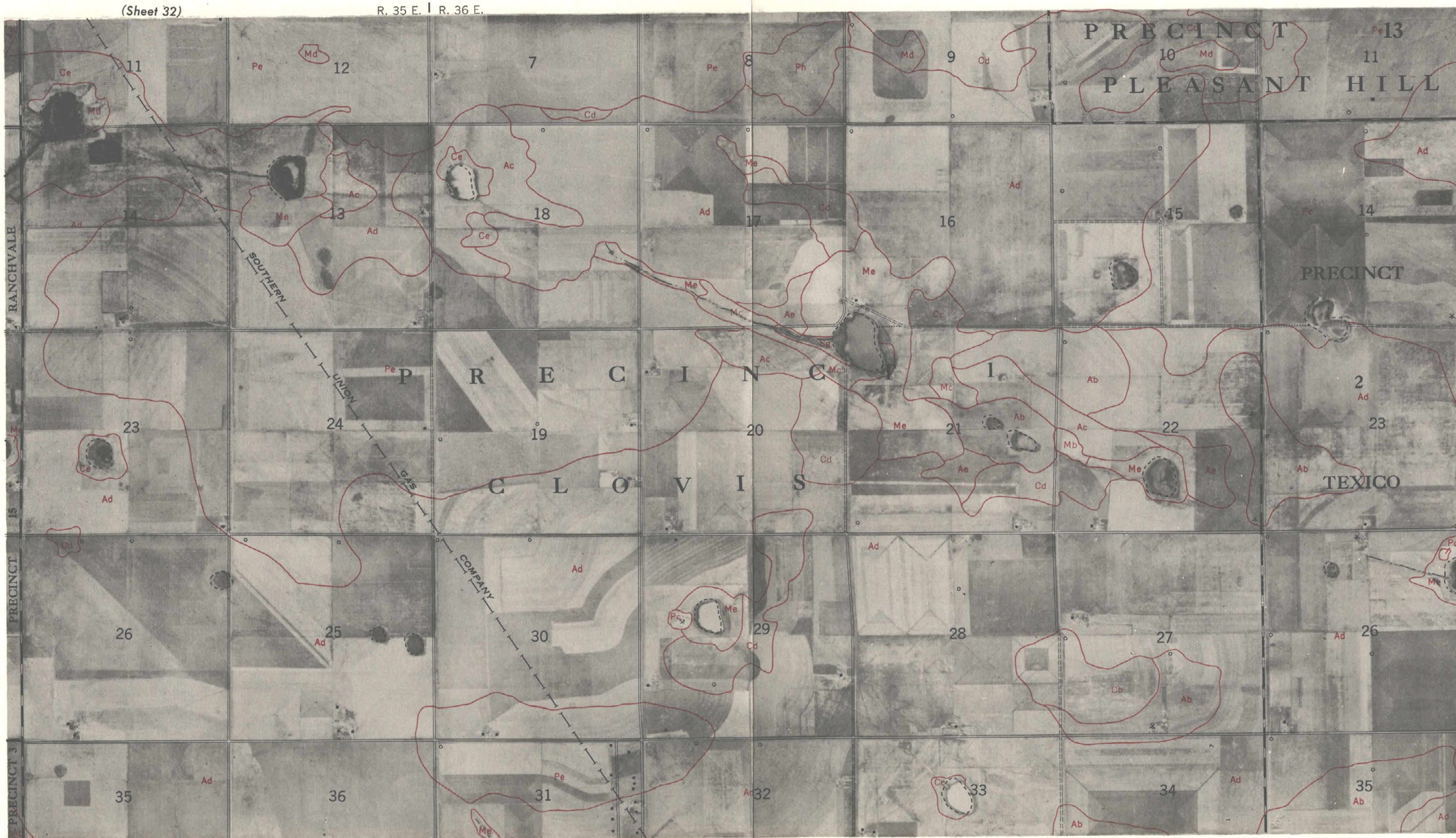
This is one of a set of maps prepared by the Soil Conservation Service, U. S. Department of Agriculture, for a soil survey report of this area. For information regarding the complete soil survey report, write the Soil Conservation Service, U. S. Department of Agriculture, Washington 25, D. C. This map compiled from aerial photographs flown in 1937 and 1951

CURRY COUNTY, NEW MEXICO

(Sheet 32)

R. 35 E. | R. 36 E.

(Sheet 37)



(Sheet 39)

(Sheet 44)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

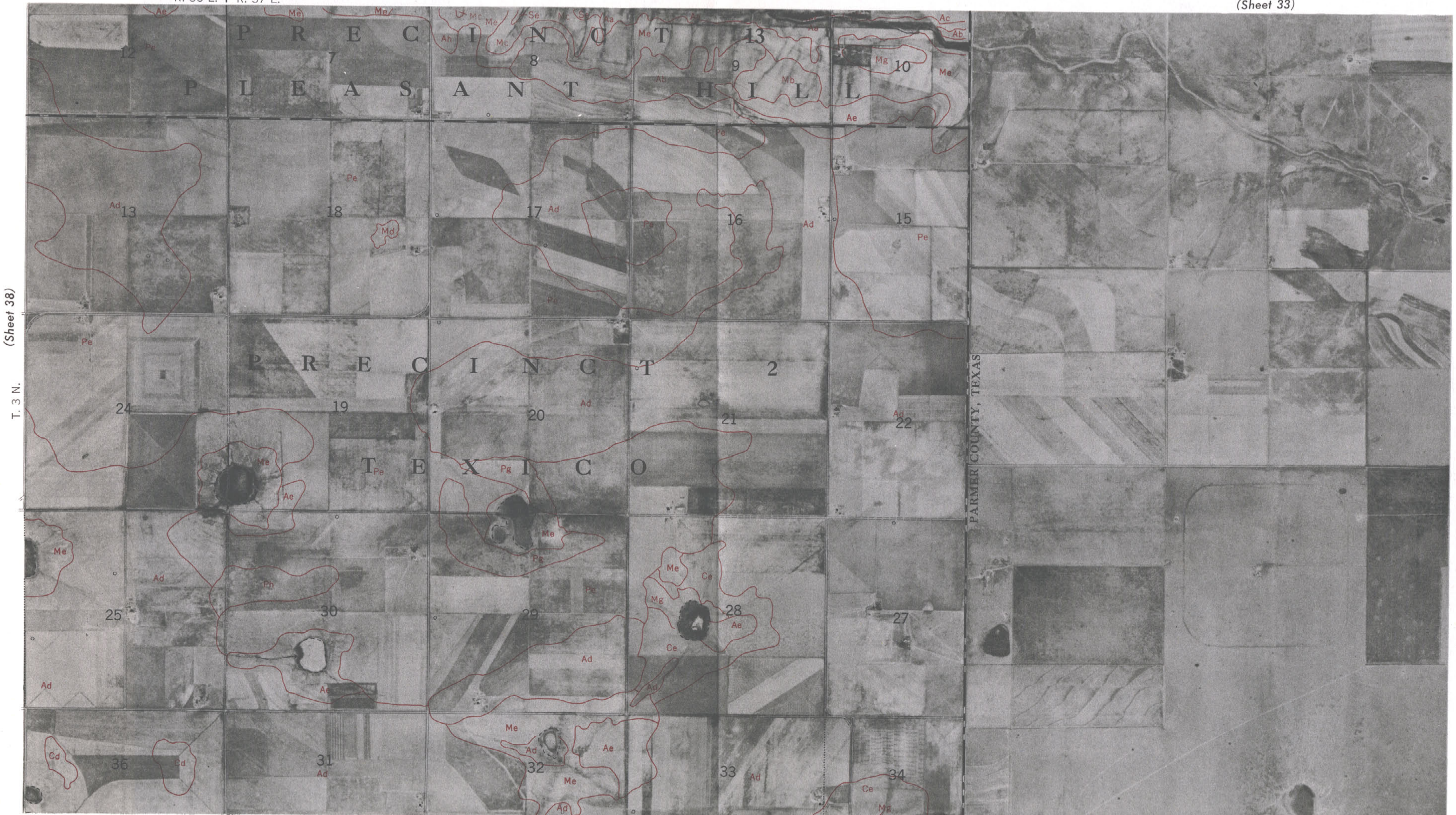
CURRY COUNTY, NEW MEXICO

R. 36 E. | R. 37 E.

(Sheet 33)

(Sheet 38)

T. 3 N.



0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

(Sheet 45)

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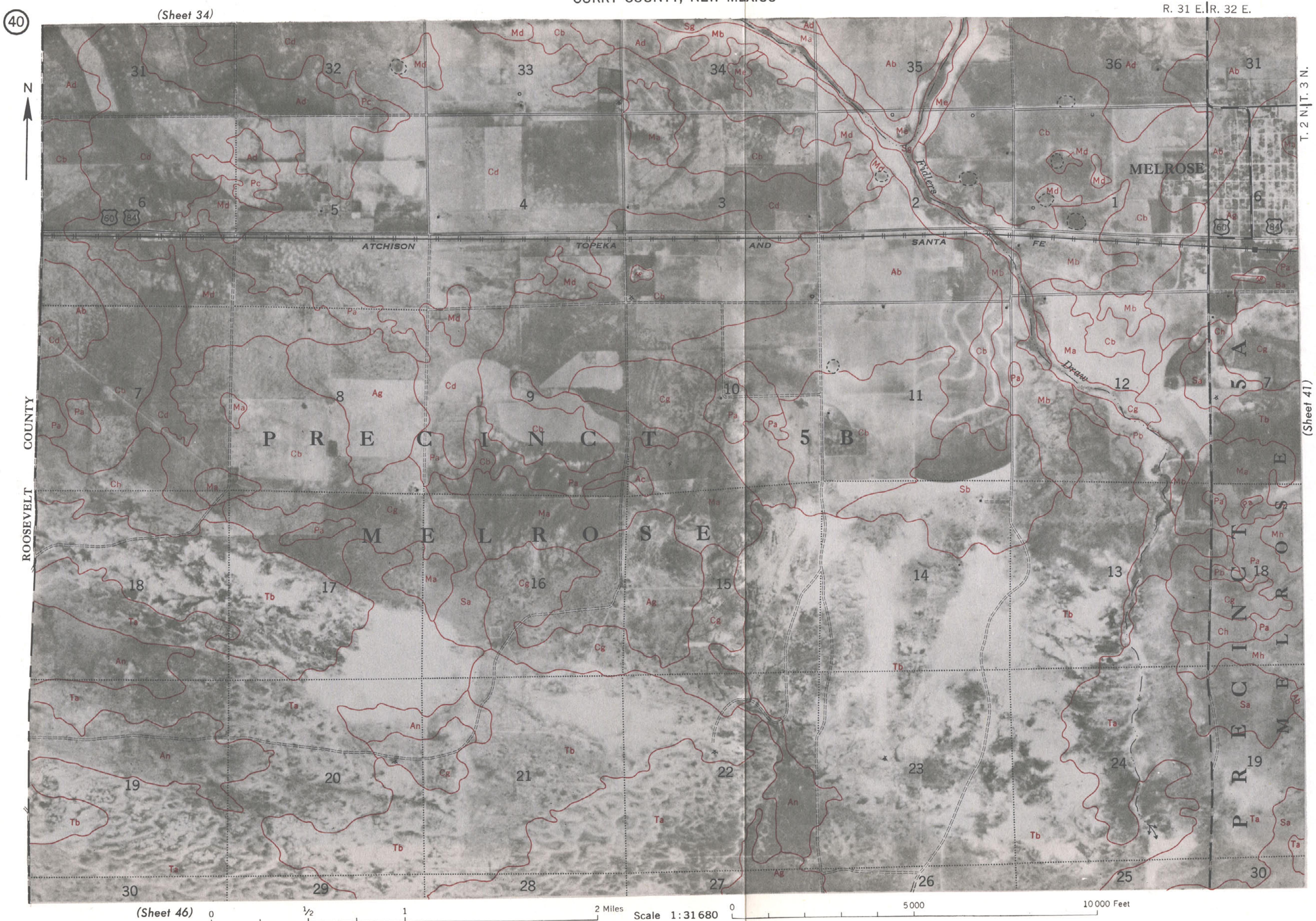
CURRY COUNTY, NEW MEXICO

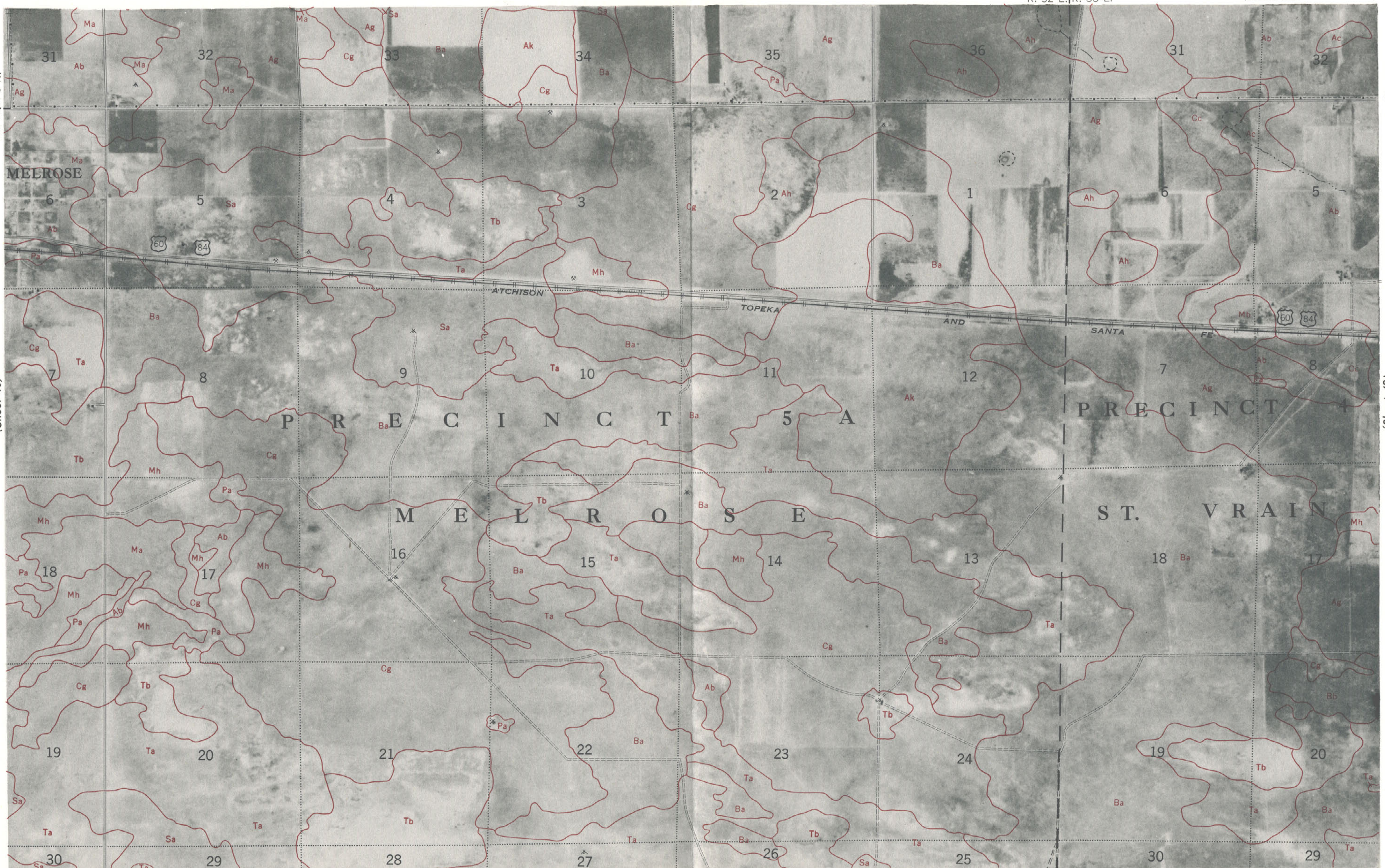


R. 32 E. | R. 33 E.

(Sheet 35)

T. 2 N. | T. 3 N.

(Sheet 40)



(Sheet 42)

(Sheet 47)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

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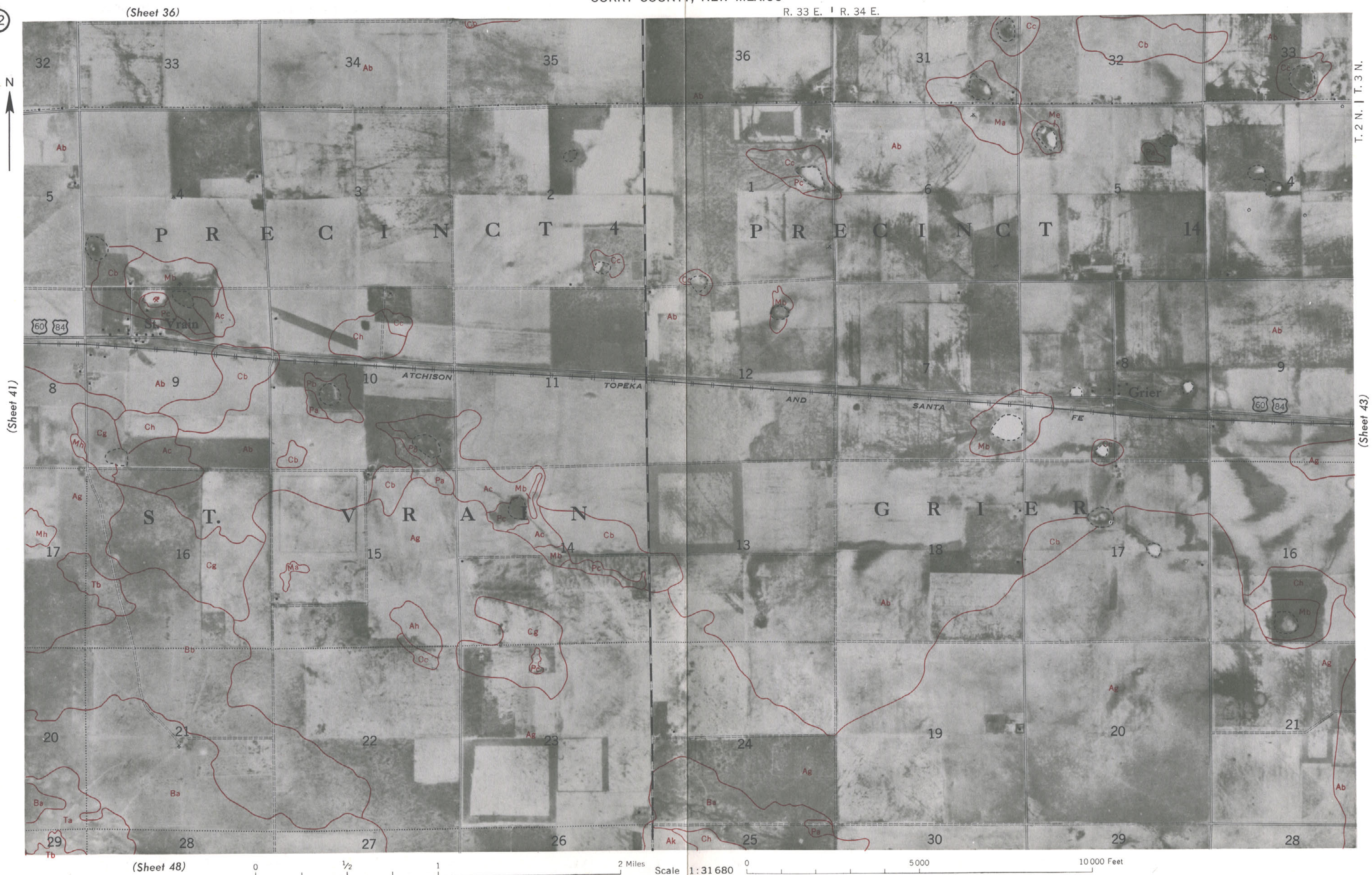
(Sheet 36)
R. 33 E. R. 34 E.
T. 2 N. T. 3 N.
N
(Sheet 41)
(Sheet 43)
(Sheet 48)
PRECINCT 4
ST. VRAIN
GRIER
St. Vrain
Grier
ATCHISON TOPEKA AND SANTA FE
60 84
0 1/2 1 2 Miles
Scale 1:31 680
0 5000 10 000 Feet

(Sheet 37)

R. 34 E. | R. 35 E.

T. 3 N. | T. 2 N.

(Sheet 42)

(Sheet 44)

(Sheet 49)

0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

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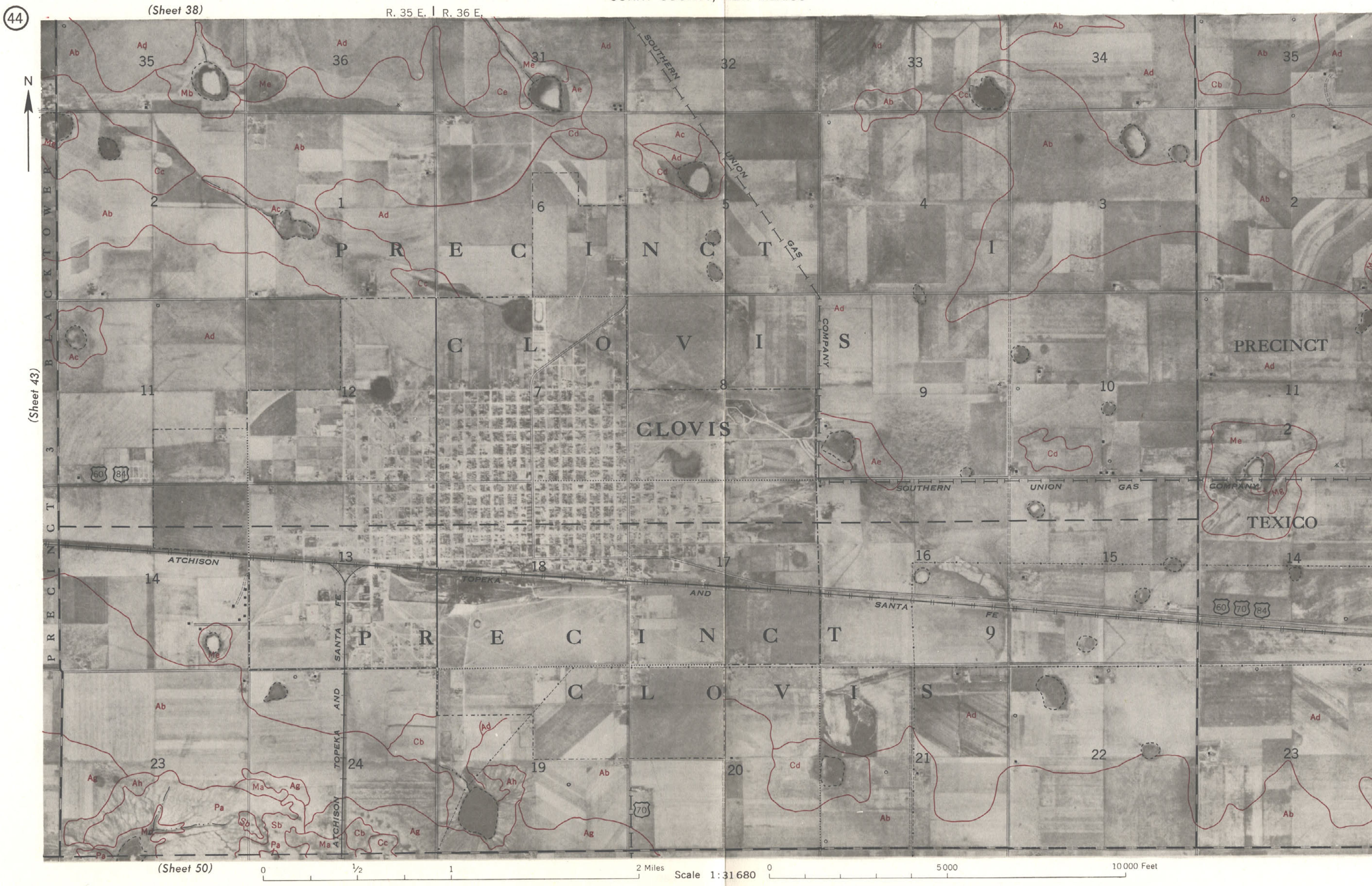
44
(Sheet 38)
R. 35 E. | R. 36 E.
N
T. 2 N. | T. 3 N.
(Sheet 43)
(Sheet 45)
(Sheet 50)
BLACKTOWER PRECINCT
PRECINCT CLOVIS
PRECINCT CLOVIS
PRECINCT
CLOVIS
TEXICO
SOUTHERN UNION GAS COMPANY
ATCHISON TOPEKA AND SANTA FE
0 1/2 1 2 Miles
Scale 1:31 680
0 5000 10 000 Feet

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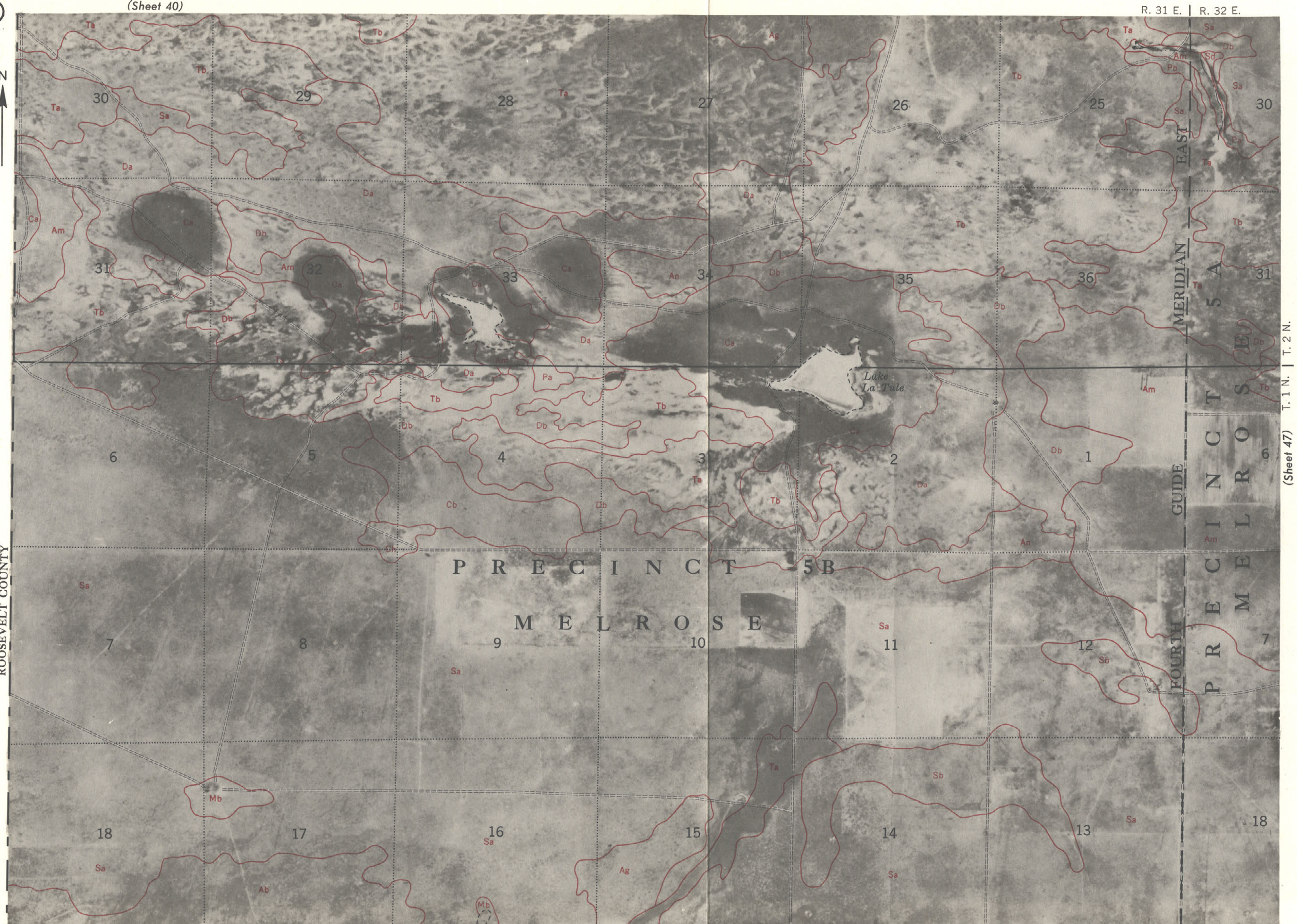
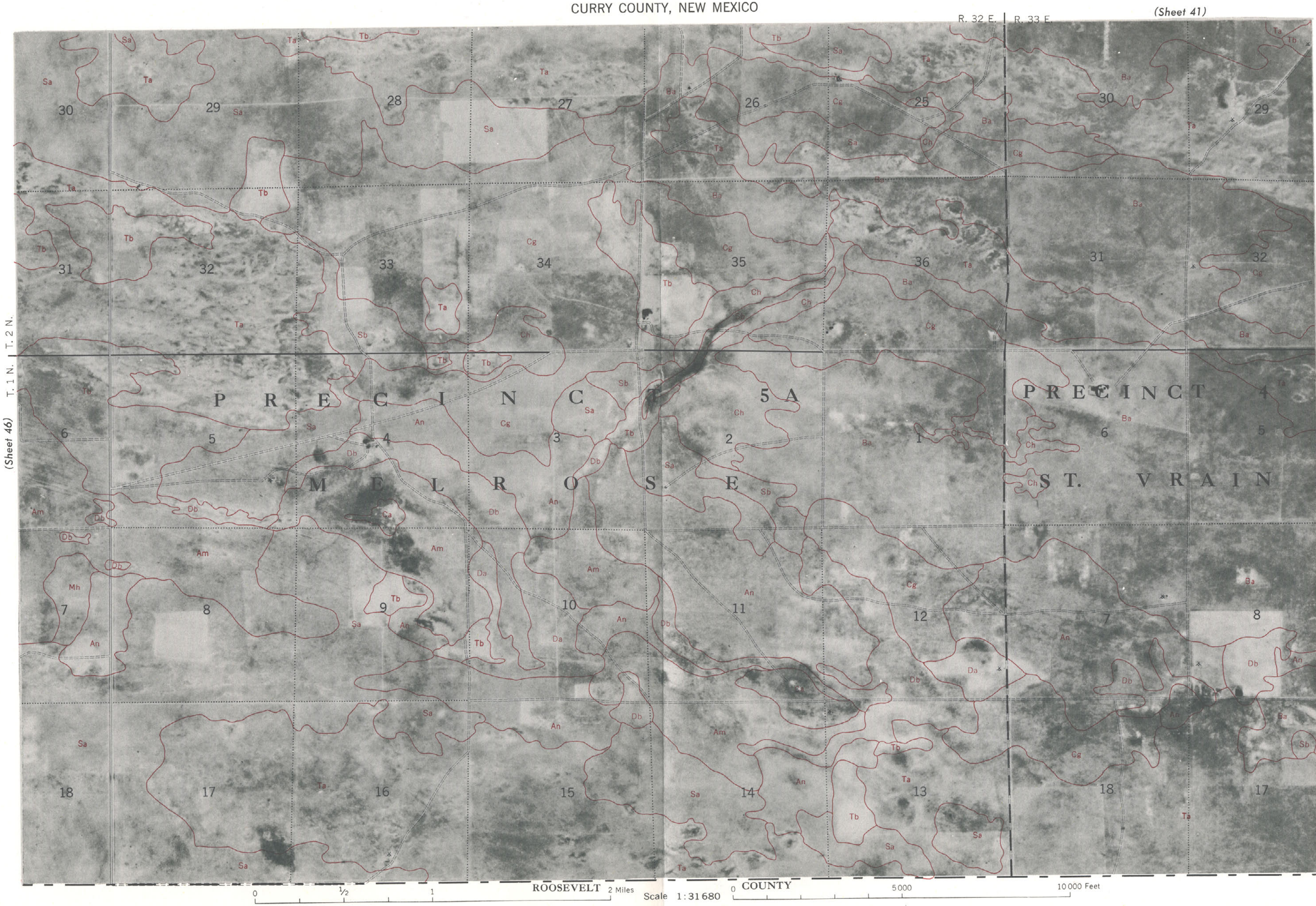
CURRY COUNTY, NEW MEXICO



Scale 1:31 680

0 ½ 1 2 Miles

0 5000 10 000 Feet



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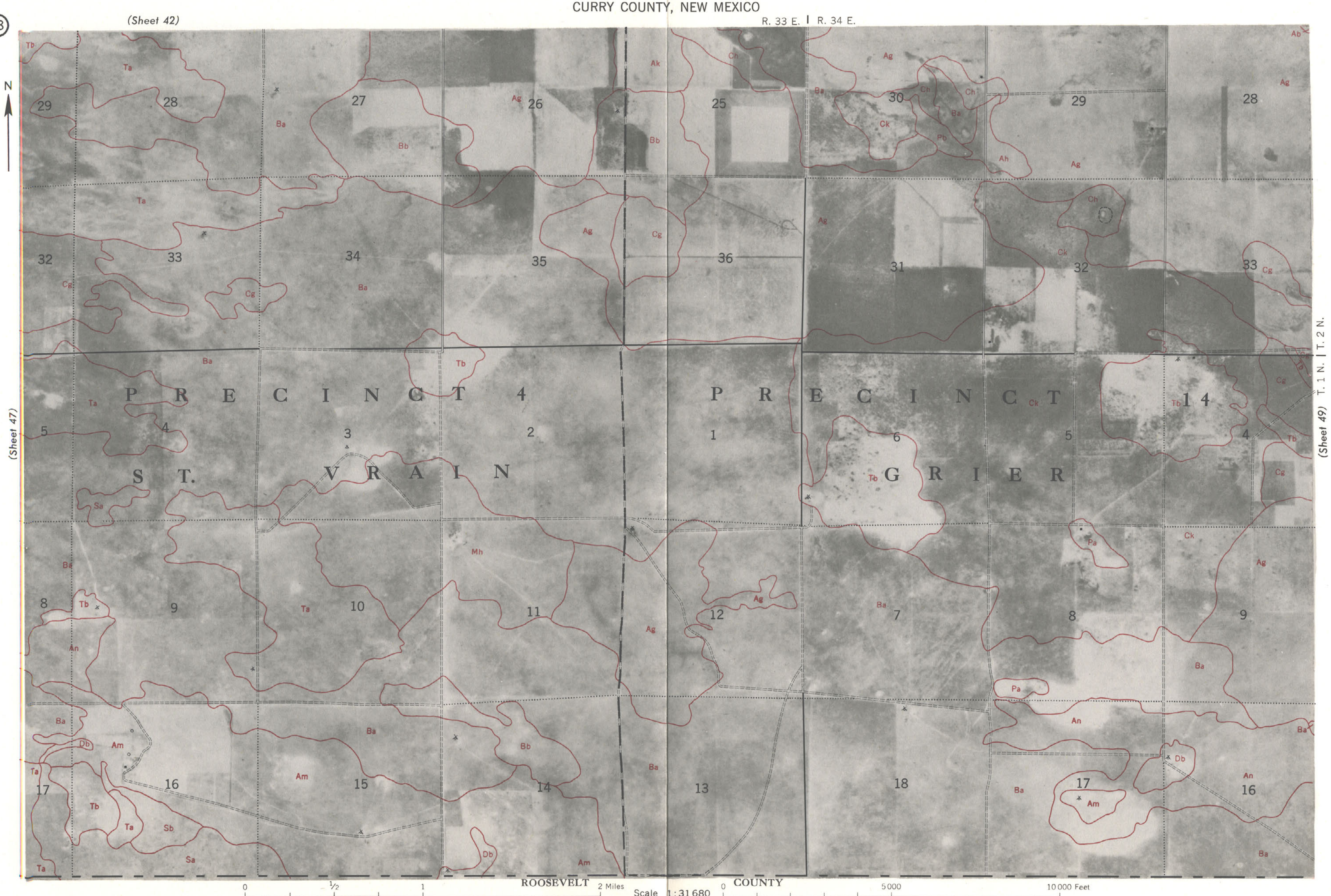
CURRY COUNTY, NEW MEXICO



0 ½ 1 2 Miles

Scale 1:31 680

0 5000 10 000 Feet

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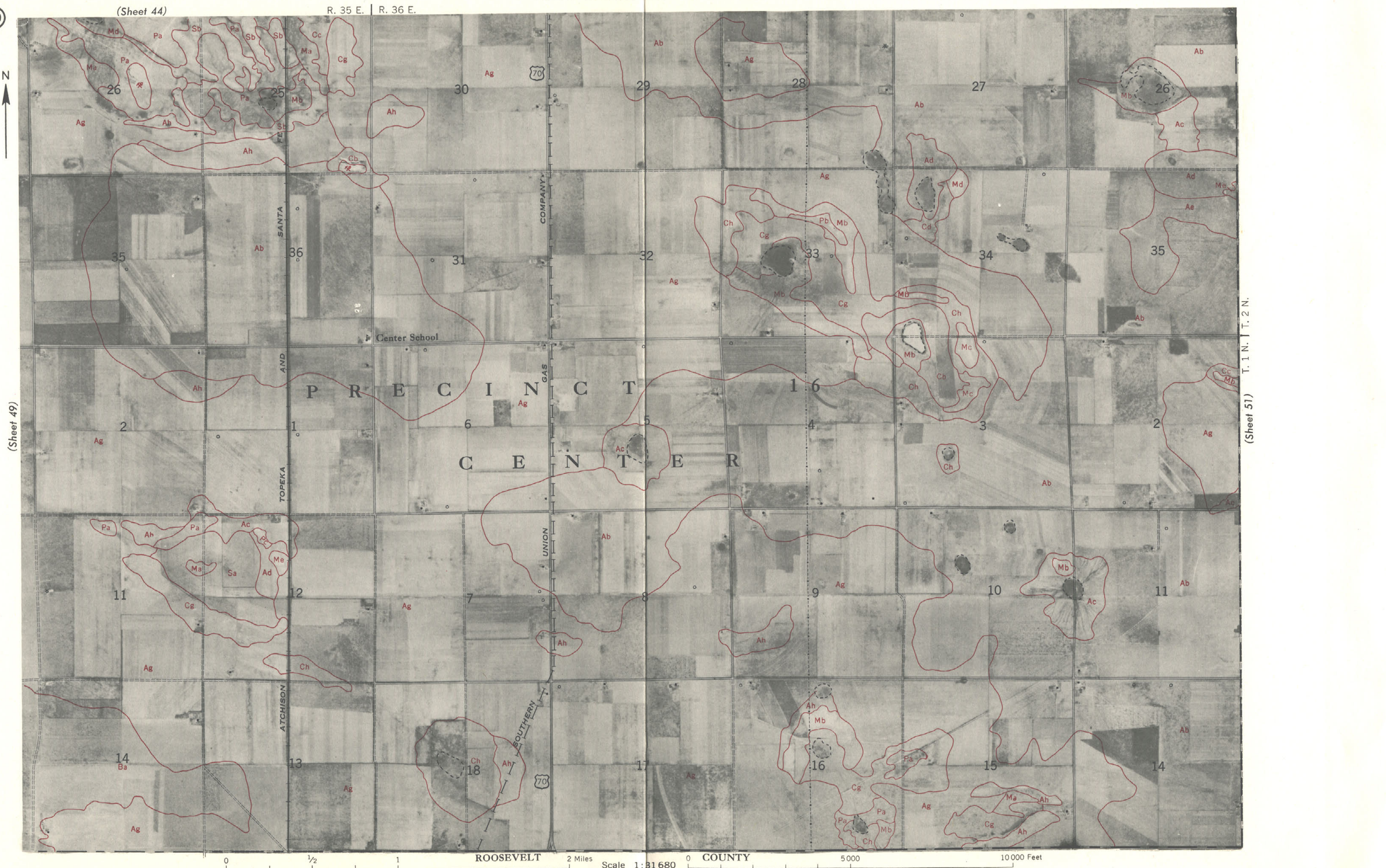
(Sheet 44)
R. 35 E.
R. 36 E.
N
(Sheet 49)
(Sheet 51)
T. 2 N.
T. 1 N.
SANTA FE
AND
TOPEKA
ATCHISON
COMPANY
GAS
UNION
SOUTHERN
70
Center School
PRECINCT
CENTER
ROOSEVELT
COUNTY
0
1/2
1
2 Miles
Scale 1:31 680
0
5000
10 000 Feet

Scale 1:31680

0 1/2 1 2 Miles

0 5000 10 000 Feet

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